# ENGINEERING AND MINING JOURNAL

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## Hemisphere Mineral Developments

PAN AMERICAN DAY, which is celebrated on April 14, holds new and unusual significance this year for the mineral industries of the Western Hemisphere. Hitherto Latin American commerce and trade have brought to the United States a wide variety of products from our Southern neighbors, but metals and minerals have not figured too prominently in the transactions. Now, however, the emphasis has changed. Copper has become more vital than coffee to the arsenal of democracy, and limited shipping facilities are reserved for metals and minerals rather than foods and fibers.

What the good neighbor policy of the United States means to the mineral industries of Latin America and to the war effort of the United Nations is outlined in two concise articles in this issue. Mr. Rockefeller directs attention to the broader aspects of aid and service to our neighbors, and Mr. Bateman shows the wide ramifications of economic warfare in obtaining mineral supplies and keeping them out of the hands of our enemies. The beneficial results of both types of activity portend future peacetime relations of inestimable value to the Americas and the World.

In the process of combing Latin America for war minerals, opportunities will be uncovered for United States capital to participate in the development of new mineral resources. A case in point is the acquisition by the American Smelting & Refining Company of a 50 percent interest in Companhia Niquel Tocantins, a company organized to develop a large nickel property in Goyaz, Brazil. The other half interest is owned by Brazilian individuals and companies. Management will be in the hands of A. S. & R. Co., which examined the property and worked out the metallurgy of the ore. The process will be tested in a pilot plant to be erected at Perth Amboy, N. J. Based on the knowledge thus gained, a commercial plant will be designed and built at the mine, in 1944 if conditions permit. The partnership aspect of the arrangement offers a commendable pattern for similar ventures in Latin America, and points the way to mutually profitable development of the hemisphere's mineral resources.

## Those Shale Reserves

AWAITING THE DAY when shale oil can compete with petroleum are the country's huge reserves of oil shales, estimated by the Bureau of Mines to contain 144 billion barrels of oil, of which, it is thought, two-thirds can be recovered. If, as some believe, the war demand for certain petroleum products may exceed the supply, these shales might indeed be drawn upon in the emergency to meet the shortage. However, the time has not arrived for any revival of the enthusiasm that was rampant in the 'twenties.

Recently, attention was focused on these shale reserves momentarily, when a delayed bulletin of the Bureau appeared, dealing with methods and costs at its experimental shale mine and treatment plant at Rulison, Colo., which has been closed since 1929. Publication of this report at this time, it appears upon inquiry, was due to a casual administrative circumstance and is without significance as to the current petroleum situation. The factual data released, however late, are welcome and should be useful in good time. For the future, these shales offer much promise, particularly for those Rocky Mountain States in which the greater part of the reserve occurs.

## Non-Metallic vs. Metallic

QUESTION IS RAISED as to the proper characterization of a certain mineral product containing 60 percent iron oxide ($Fe_2O_3$), long known as an ocher but sold for consumption in various ways—now as an ocher for use as a pigment, now as a soft brown iron ore for smelting to iron. As a pigment, it has been employed in the past as an ingredient in making linoleum; currently it is used in the production of a camouflage paint. Here be it noted that ochers commonly used in the paint trade are much lower in iron oxide content.

Similarly, it is asked whether barytes, or natural barium sulphate, is a non-metallic substance or a metallic ore. Useful by reason of its high specific gravity for weighting drilling muds, barytes sold for this purpose passes unquestioned when classed as a non-metallic; likewise when employed as a raw

material for chemical manufacture. Yet barium is an alkaline earth metal. It is already finding some use in alloys, in radio tubes, and is expected to have increasing application as the cost of production is lowered.

As to whether a non-metallic mineral may be termed an "ore," such practice has not been customary, but undeniably the use of the term "ore" has been broadening. Distinction between "non-metallic" and "metallic" has generally been made on the basis of principal use, according to excellent opinion in the Bureau of Mines. Where a metallic mineral is produced both for its metal content and for use in an unreduced state, an arbitrary decision may be necessary. The ocher in question, however, might justly be called a metallic ore, without any stretching of these statements. The case for barytes is less well-defined. But viewed as a source of barium, with some discounting of the future, and as an ingredient of lithopone, little straining is required to classify it as a metallic ore.

These questions have more than academic significance for at least one producer of the minerals mentioned who is selling them for uses essential to the war. Needing fuel oil to operate, this company has been threatened with a reduction of its oil quota by 40 percent because its operations are classified as non-metallic mining and not as metal mining, which would bring them under the Petroleum Co-ordinator's Schedule A. Revision of this classification would appear to be in order. Further, if classed as metal mining, this enterprise would be entitled to elect percentage depletion.

## Plant a Garden

ANY MINER who takes the trouble to raise his own supply of vegetables this year, and can a substantial quantity for next winter, will congratulate himself before next spring.

The simple arithmetic of the situation is convincing. We have a food "plant" ordinarily able to feed 135 million people. The capacity of the plant is seriously reduced by loss of manpower and lack of equipment and fertilizer. This loss is already irreparable as far as the next year and a half is concerned. Our soldiers and many of our war workers require more food than ever before. As many as 70 million people in allied and occupied countries must be fed by us. Some food will go down with our ships.

Thus, it is conservative to say that, except for wheat and cotton, the demand for food will be at least double what the plant can produce. The results are obvious: We shall be short. Most of us can do nothing about meats and fats, but a great many can raise vegetables and can them for next winter. So, plant a garden and take care of it. Companies may well cooperate with their employees in this activity.

## Meat for Miners

A SENSIBLE POINT was emphasized recently by Arthur S. Knoizen, chief of the Mining Equipment Division, WPB. He urged that mining men press upon local and district rationing agencies the necessity of giving miners more than an ordinary ration of meat. We concur in this idea. The majority of miners work hard enough so that efficiency cannot be maintained on the rations now in effect. In many cases the working places are warm; also sunlight is absent. With the whole war effort bottlenecked by the raw material supply, it is absurd to court a lowering in personal efficiency of the men who win vital minerals from the earth. Even in England, where the food supply is far shorter than here, miners receive extra meat rations.

## Incompetent Testimony

A SUBCOMMITTEE of the Senate Committee on Small Business is investigating the rôle of small mines in the war effort, particularly the reports that potential sources of metals in small quantities are being neglected and that production is being stifled.

Using the committee hearings as a sounding board, David L. Podell, chief, complaints section, anti-trust division, Department of Justice, left-handedly championed the cause of small mining companies by castigating the big fellows. He offered some strange bits of fiction in contrast to the facts. Fiction by Podell: Nickel is notoriously short due to the activities of the International Nickel Company; the Aluminum Company of America is responsible for the "shortage" of aluminum; the Big Three in copper effectively block the efforts of small independent operators to get government aid.

Mr. Podell should get a new theme song; the old one is worn out. He was an incompetent mining witness, and his reported testimony was buncombe. He contributed nothing to the cause of small mines.

We understand well the importance of small mines and recognize their vital contributions to the war. We sympathize with their difficulties in getting men, money, and machinery. But their plight is not due to the big fellows, whom we do not deem it necessary to defend. Were it not for the latter, metals would not be as plentiful as they are. On the other hand, we cannot refrain from putting Podell in a pillory for flagrant and unwarranted misstatements about those who are bending every energy toward winning the war. The committee will recognize his testimony as propaganda against Big Business, but it is too bad to allow it to clutter up the record.

# Reflections from Washington

*Washington News Bureau*

DEFINITE RESULTS are discernible in the operations of the War Production Board affecting mining since the establishment of the Mineral Resources Co-ordinating Division under Howard Young. A good many former sources of friction have been removed, conflicts have been ironed out, and more realistic views on mining matters are transmitted to the high command. This does not mean that everything is in "apple-pie" order—probably that is impossible, considering the difficult and changing conditions under which WPB has to work—but a marked change for the better is evident.

### Possible New Agency

IT IS POSSIBLE that Mr. Young may be made the head of a new autonomous Mining Administration in the near future, comparable to the organization which handles power problems within WPB. There is strong senatorial pressure for the establishment of such an agency, it being the hope of senators from mining states that the result would be a longer-range, broader program of domestic mine development and encouragement. A meeting was held in mid-March between Donald Nelson and Charles Wilson, WPB heads, and a group of Western senators and representatives to go over the possibility of establishing a mining administration. The WPB officials agreed to investigate the possibilities of expanding mining activity and to report back to the group at a later date.

A satisfactory answer to the interested senators and congressmen is bound to bring into focus a number of controversial problems which have long plagued WPB. One problem is how far the government should go in encouraging production from low-grade or small deposits which are bound to use up more materials and labor per unit of output than larger or richer deposits. Another is what policy to pursue with respect to increasing or lessening our dependency on foreign sources of production. The domestic-expansionists point out the serious depletion incident to a long war and danger of being cut off from foreign sources of supply, whether from lack of shipping space, submarine activity, or other causes. The economically minded argue against the wasteful use of our much-needed manpower and materials and the undesirability of setting up inefficient enterprises, the post-war future of which can be assured only by some form of subsidy. Obviously, the decisions of competent administrators on these controversial problems will be near the middle of the road.

### CMP Baptism of Fire

THE CONTROLLED MATERIALS PLAN weathered its first major assult in March. This first burst of open opposition came from Detroit, a round-robin of complaint from the auto manufacturers, who charged that CMP allotments were balled up and that production would drop in the second quarter.

A two-day series of lively meetings in Washington ended the battle, if it didn't straighten out all the kinks. Chief concession was WPB's decision to postpone effective date of CMP on carbon-steel deliveries until April 15—most other controlled materials are sufficiently carefully allocated that the commodity divisions in WPB can do a lot toward seeing that the right people get material at the start even if CMP allotment numbers aren't all shipshape.

### Revisions in P-56

BRINGING the mining industry into a better strategic position in relation to industry in general was the intention of the mid-March amendment of the mine and smelter repair and maintenance order, P-56. The amended version of the order provides a "simplified" procedure governing purchases and deliveries in all branches of the industry.

As amended, P-56 removes the mining industry from the jurisdiction of CMP Regulation No. 5—the CMP maintenance repair and operating supply order—and CMP Regulation No. 2 restricting inventories.

All domestic and some foreign mines will now receive priority assistance in securing maintenance, repair, and operating supplies through P-56, whether the mines have serial numbers or not, including the gold mines that are operating under special dispensation. Mines with serial numbers will make applications for maintenance, repair, and operating supplies on form PD-400, under which quotas were to be issued beginning April 1. It is important that the allotment number as well as the authorized rating should be shown on second-quarter purchase orders. Controlled materials cannot be secured without both. Mines without serial numbers or which are not specifically provided for in the order have a blanket assignment of an A-2 rating for maintenance, repair, and operating supply needs, which can be applied by endorsement of their purchase orders as directed in Priorities Regulation No. 3.

Special applications for new machinery and other capital equipment must be filed with the War Production Board, giving a full description and stating the reasons the purchase is necessary. Mines without serial numbers finding the A-2 rating too low to secure the needed materials may similarly apply for a higher rating.

### Allotment Numbers

THE RATING for mines holding serial numbers is AA-1 for maintenance, repair, and operating supplies. The last two digits in an allotment number, which must accompany the rating on every order involving the controlled materials, copper, steel, and aluminum, designate the month of delivery for which the allotment number is valid. Suppliers are compelled to reject orders under allotment numbers if they cannot make deliveries in the month indicated by the allotment number; they cannot enter an order for future delivery unless an allotment number for the month of delivery is provided prior to acceptance of the order.

Operators who have construction projects authorized under PD-200 procedure are warned that they must apply on form CMP 14 for allotment numbers in regard to controlled materials; otherwise they will be unable to obtain deliveries.

### Future Deliveries Permitted

TO FACILITATE the early placing of orders for future delivery, the Mining Equipment Division will issue allotment numbers permitting purchases

(*Continued on page* 81)

Nelson Rockefeller, at a pres conference in Rio de Janeir where he was the guest o Getulio Vargas, President of Bra zil. The latter stands at his righ

# Hemisphere SOLIDARITY in a World at War

**Nelson A. Rockefeller** *Coordinator of Inter-American Affairs*

WE HAVE NEW REASON to celebrate Pan American Day in the eventful year 1943. Continental solidarity has been translated into a practical reality. Free nations of the New World have advanced co-operative programs for hemisphere defense and for hemisphere development, and have built sturdy foundations for the future.

Today, the Americas are determined to preserve the liberty for which their valiant heroes fought and died. Here briefly is the result of this determination on the part of the American republics:

The Western Hemisphere has become the all-important source of critical materials for our vastly expanded production schedule. From the Americas we are receiving a steady flow of copper, nitrates, bauxite, tin, lead, fibers, rubber, wool, and other vital materials for victory. Without this flow of material, the United Nations' war machine could not function adequately.

From a military point of view, the cooperation of the American republics has bolstered hemisphere defenses to record strength. At present twenty of these republics have broken off relations with the Axis. Twelve have declared war against the enemy. Many of the Americas have mobilized their armed forces. Planes and naval vessels of Mexico, Brazil, and Cuba and the other American nations are helping to safeguard the ocean highways of the New World by uniting in a campaign against German submarines.

The Americas have taken other steps for joint defense, such as the registration of enemy aliens, freezing of Axis funds and credits, confiscation of Axis arms and ammunition, and the control of subversive activities. Hemisphere defense is being coordinated further by the Inter-American Defense Board, the United States-Brazil Joint Defense Commission, the United States-Mexican Joint Defense Commission.

A graphic illustration of the practical significance of this unity is the cooperative health and sanitation program recommended in January, 1942, at the Meeting of Foreign Ministers of the American republics at Rio de Janeiro.

The work includes the organization of health centers in the Amazon basin, from Belem, gateway to the Amazon, to Iquitos, Peru, 2,300 miles up the river. It includes many smaller outposts for distribution of medical supplies and treatment of the sick, projects for training of nurses, sanitation of towns, floating dispensaries for rivers in the rubber country, and the distribution of anti-malarial drugs.

Another illustration of hemisphere solidarity is the vast development program in Central and South America. It includes hundreds of projects for expansion of transportation—airways, highways, railroads, shipping facilities; development of modern health and sanitation services; expansion of mining, agriculture, commerce, and industry, and the construction of airports, schools, hospitals, training centers.

Behind—and ahead of—the great work being done to strengthen the bonds of mutual assistance between the Americas in wartime is the immense task of establishing a sound basis for mutually profitable trade relations.

Long-term contracts for United States purchases of rubber, minerals, fibers, and other products is encouraging hemisphere trade expansion as well as helping stabilize hemisphere economy during the war. Many of these involve financial and technical aid.

Meanwhile hemisphere solidarity is being furthered through the press, radio, and motion picture; through science and education, through interchange of students and professors, through mutual understanding on many fronts. These far-reaching measures, designed to aid the peoples of the New World, will contribute much to the Age of the United Hemisphere.

# FOREIGN MINERALS for the War Program

**Alan M. Bateman** *Chief, Metals & Minerals Division, Board of Economic Warfare*

**Alan M. Bateman**

EVERY READER of the *Journal* realizes that this is a war of minerals. Many, however, do not understand that there are certain changes in the mineral program compared with that of the first World War. There are four outstanding differences: (1) the quantities of metals needed are vast, almost unbelievable—published requirements of zinc and copper seem fantastic; (2) the circumstances that the United States could ever be short of those minerals of which we thought we had plenty for any emergency; (3) that the uncommon commercial minerals could play their present important rôle; and (4) that we could become so dependent upon foreign mineral supplies for the war effort.

All this has meant that we have had to turn to the far corners of the accessible world to supply our needs. This involves not only simple procurement, but examination, development, expansion, financing, and the establishing of particularly complicated economic and political relations with sovereign countries. These have to be interrelated with changing shipping conditions, and with sudden development of new uses for metals and minerals. We have to take into account the internal economy of individual countries and deal with internal mineral problems that bear only indirectly upon our import program, such as the development of foreign fuel supplies to energize their transport and mineral industries and to secure export shipping of our fuels. The parts played by the other interested government agencies have had to be coordinated. We have to plan far ahead so that we may not be caught short, and to make sure, if one mineral source should be interfered with, that another is under development. The foreign mineral program thus is more complicated than the domestic one.

Naturally we turned first to the Latin-American countries. A pre-war policy of sending technical advisers had to be replaced by one of sending direct-acting mineral missions with responsibility and power to negotiate and procure. We now have them in Mexico, Central America, Colombia, Peru, Bolivia, Chile, Argentina, Brazil, South Africa, Congo, West Africa, North Africa, Spain, Australia, India, and China. In Brazil alone there are 91 mining engineers and geologists.

The first foreign mineral expansion program was begun in Mexico. There an agreement was concluded; metal prices were established; taxes and railroad tariffs stabilized; and labor conditions made more conducive to expansion of the mineral industry. With this groundwork laid for greater long-term stability, operations of existing mines and mills were expanded; old mines were rehabilitated, new ones developed, and new mills built. The increase in mineral output proved vastly greater than initially hoped for.

In Bolivia a well-staffed mission is developing new properties of tungsten, tin, and bismuth. Likewise, tin and tunsten output is being increased in China, the Congo, and West Africa. Increase in production of copper and zinc is being made on four continents, and of manganese in Africa, Brazil, Cuba, and Mexico. Greater demand for mercury was met by expansion in Mexico, Canada, Peru, and Chile.

Among the most striking of new war demands are those for the less common industrial minerals, such as quartz crystal, mica, tantalite, and beryl, and for minor metals such as bismuth, cadmium, and arsenic. New foreign sources had to be sought and development programs inaugurated. Tantalite had to be obtained from Brazil, Australia, Belgian Congo, Nigeria, and Southern Africa.

Fantastic are the requirements for quartz crystal. The Board of Economic Warfare was suddenly faced with the problem of developing it in the quantities needed. Brazil is the only place known where quantity production can be obtained. A small hand production of scores of tons had to be expanded at once about ten times. Mica is almost of as great importance, and the scale of operations in Brazil is nearly as great as that of quartz.

Increases in metal and mineral output are obtained as in domestic expansion—by simple price increases, by time contracts with cancellation and bail-out clauses, and by repayable loans. Marginal production in some cases requires special treatment.

Ever greater attention is being given to servicing existing foreign mines. This consists of aiding in securing priorities and exports of equipment and maintenance supplies. The Metals and Minerals Division is establishing eight Latin-American supply depots where, without delay, replacement parts can be obtained by small mines. No less important is the economic servicing whereby inflation, cost of living, availability of consumer goods, wages, and labor relations are studied.

Our field organizations are eyes and ears to our programing and facilitating organization in Washington, where a wide-awake technical, business, legal, economic, and secretarial staff is constantly on the alert to see that we do not fail in our imports of needed war materials. A big job is still to be done. The help and cooperation of all are needed.

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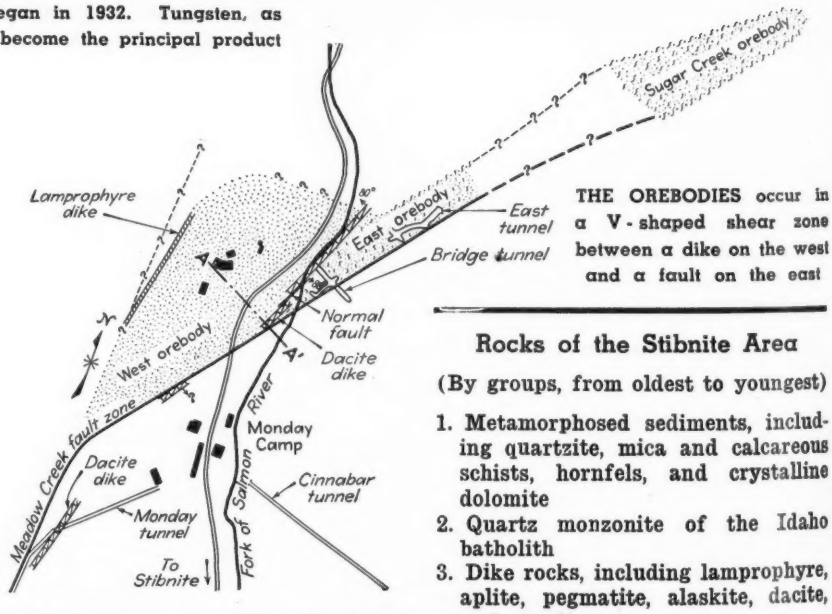
# Yellow Pi

**THE CONCENTRATOR and other surface plant at Yellow Pine mine. Mining and milling, for antimony and gold, began in 1932. Tungsten, as scheelite, was found in 1941 and has since become the principal product**

▶ THE YELLOW PINE MINE, *owned and operated by the Bradley Mining Co., of San Francisco, is in Idaho, in the Stibnite area northeast of Boise. The region is rugged, with severe winters. Three different concentrates—antimony, gold, and tungsten—are now produced, which are trucked 80 miles to railroad, two high points, 7,300 ft. and 6,600 ft. in elevation respectively, having to be crossed en route.*

ALTHOUGH the Bradley Mining Co., of San Francisco, has been interested in its Yellow Pine mine, in Idaho, since 1927 and started mining and milling in 1932, it was not until February, 1941, that the property's most valuable asset—tungsten—was discovered, this in addition to the gold and antimony already known. The find was made by Donald E. White, of the U. S. Geological Survey, while examining diamond-drill cores of the U. S. Bureau of Mines. Intelligent and extensive drilling had been done by the Bureau to prove large antimony reserves. No one, however, had the slightest idea that scheelite orebodies of valuable and strategic proportions would be disclosed.

Following Mr. White's timely announcement, all drill cores were lamped with ultraviolet light to determine the extent and nature of the deposit. A vertical shaft was started in April, 1941, and mine development undertaken that summer. Early in August the mill feed was changed partially from low-grade gold ore to high-grade tungsten ore. All gold mining and milling were stopped late in the fall and efforts directed exclusively to increasing production.




**THE OREBODIES occur in a V-shaped shear zone between a dike on the west and a fault on the east**

### Rocks of the Stibnite Area

**(By groups, from oldest to youngest)**

1. **Metamorphosed sediments, including quartzite, mica and calcareous schists, hornfels, and crystalline dolomite**
2. **Quartz monzonite of the Idaho batholith**
3. **Dike rocks, including lamprophyre, aplite, pegmatite, alaskite, dacite, and rhyolite**
4. **Glacial deposits**
5. **Recent stream deposits**

Since the spring of 1941, the payroll has increased from 100 to 650 men and the total number of persons in camp from 400 to 1,500. Many of the employees are married and have children, which necessitated building a large number of homes, a new and bigger school, and a hospital. The mill has been converted completely to tungsten production, and its capacity increased from 450 to 800 tons per day, with 1,000 tons hoped for. Credit is due to H. D. Bailey, general superintendent, his staff, and employees for progress made in this primitive, remote region.

## THE GEOLOGY

In the area that is under immediate consideration here, the prevailing rock is the quartz monzonite shown in the accompanying table. Typically, this is a medium-grained rock with a somewhat gneissoid, granitic texture consisting of about 25 percent quartz, 60 feldspar, 10 biotite, and 5 chlorite, muscovite, and other minerals. The aplite, pegmatite, and alaskite of the third group essentially consist of quartz and feldspar, and are distinguished from each other

# Pine Mine

## Unique in producing the exceptional combination of Tungsten, Antimony, and Gold . . .

**John D. Bradley**
*Manager, Yellow Pine Mining Co.*
*Stibnite, Idaho*

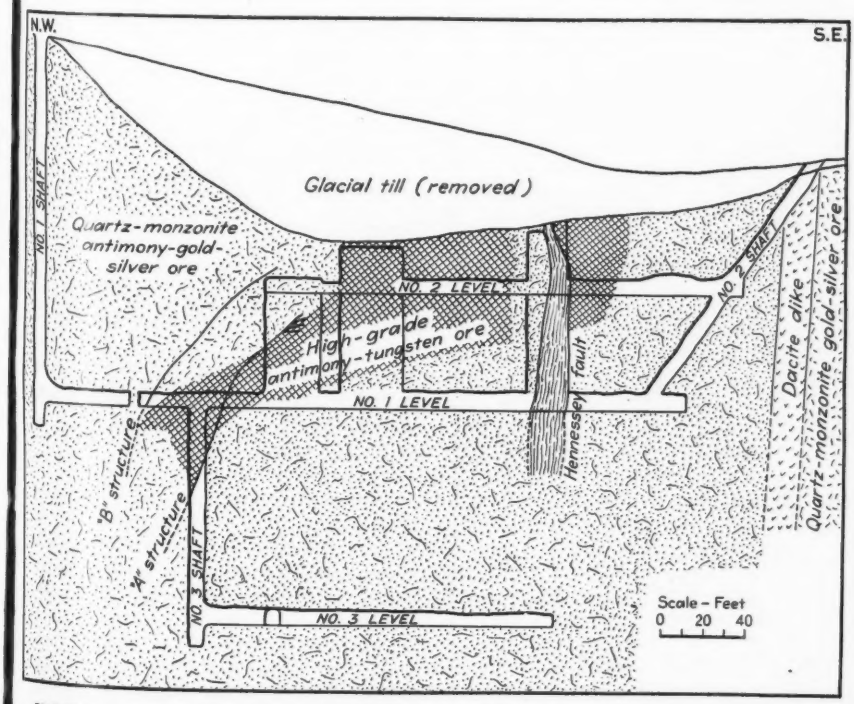
**Joseph A. Mecia**
*Chief Engineer and Geologist*

**Robert E. Baker**
*Mill Superintendent*

by grain size. The dacite is a greenish gray rock with large phenocrysts of white or yellowish feldspar, green muscovite, and glossy quartz, and with smaller phenocrysts of black biotite, all in a dense ground mass. Lamprophyre dikes are grayish green. The principal minerals are feldspar, biotite, olivine, apatite, and magnetite.

Quartzite and dolomite predominate among the metamorphosed sediments. The former is a coarse-grained, white rock usually containing little or no mica. The dolomite is crystalline and light gray, white, or buff. Near the contact with the quartz monzonite, typical contact metamorphic minerals have developed. The glacial deposits (Pleistocene) are as much as 150 ft. thick in places and cover nearly all of the orebody of the mine. They are made up of coarse material, with some boulders measuring several feet in diameter. The recent stream gravels are negligible in bulk.

The country rock, quartz monzonite, is traversed by numerous fracture zones, most of which trend north to northeast and dip east and west. Principal zones explored so far are the Meadow Creek fault, the Yellow Pine shear, and the Northeast system.



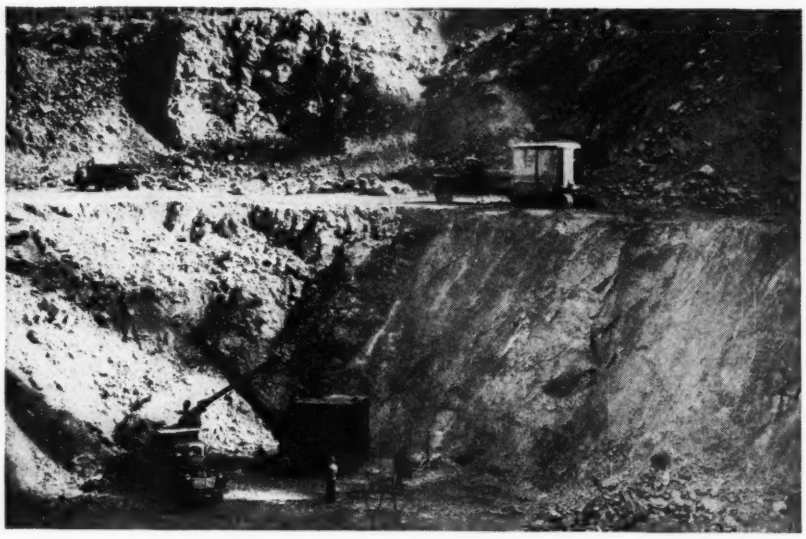

**HOW THE ORE LIES UNDERGROUND between No. 1 shaft and No. 2 shaft, is indicated in this vertical section taken along line A-A' on plan on opposite page. The Hennessey fault, seen in right center, is part of the Yellow Pine shear zone**

The Meadow Creek fault is exposed at several places in the Meadow Creek mine and in the Monday tunnel, driven along the fault in hope of finding other orebodies similar to the Meadow Creek deposit. The fault strikes due north to a point west of Monday Camp (see accompanying surface plan), beyond which its course is not fully known. From this point it appears to swing abruptly northeast, striking N. 25 to 30 deg. E. and forming the eastern boundary of the Yellow Pine shear zone. The minimum width of the fault zone, as exposed, is 100 ft. Maximum width has not been determined, but probably is several hundred feet. Dip is nearly vertical.

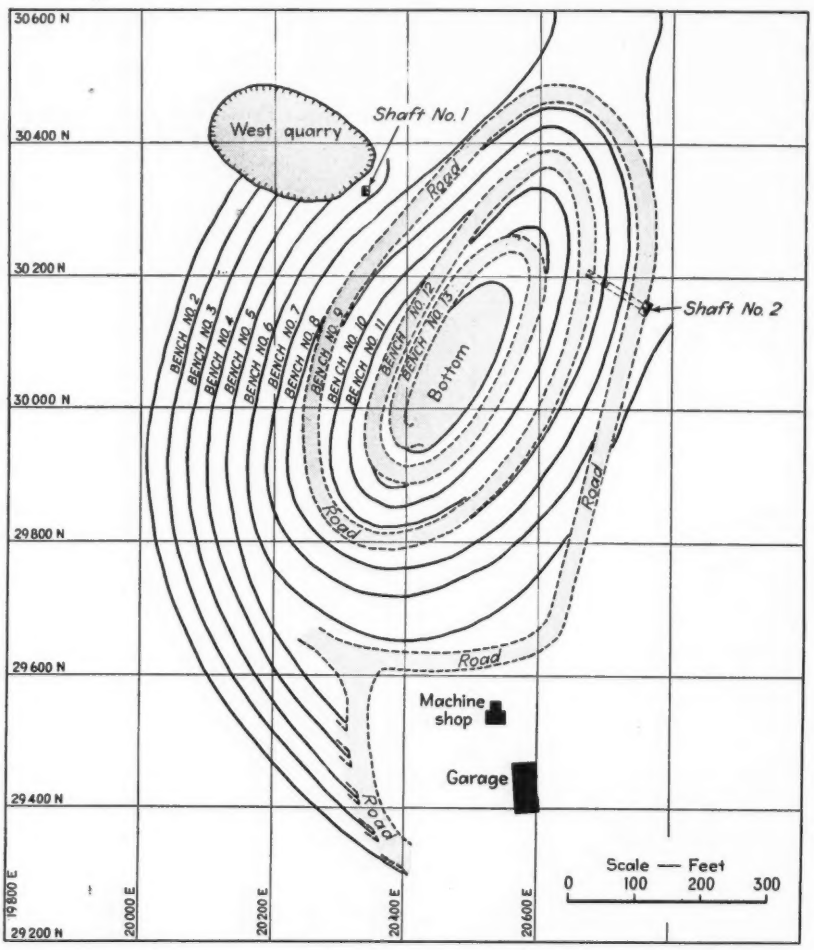
The Yellow Pine shear zone containing the orebodies of the Yellow Pine mine is in the form of a "V." Its western limit, or left side of the "V," is marked by a lamprophyre dike which strikes N. 10 deg. E. and dips 60 deg. E. The eastern limit, or right side of the "V," is the Meadow Creek fault, striking here about N. 27 deg. E. Dimensions of the shear zone are not known, but just north of the shaft the "V" is about 900 ft. wide. Several fracture systems are present, but it is difficult to distinguish a dominating pattern from surface exposures. Underground, however, a set of fractures trending N. 45 to 70 deg. E. is outstanding and will be discussed later. Both shearing and brecciation are pronounced throughout the Yellow Pine zone. Some of the shears have gouge and some have not. Uncemented fault breccia is abundant along some of the post-scheelite shears, whereas in other parts the breccia has been cemented. The shear zone probably is related to the Meadow Creek fault, and is in a "horsetailing" or "offshoot" relation to it at the bend in the fault line.

A system of conjugate fractures

# OPEN PIT MINING OPERATIONS



**FROM THE PIT WORKINGS** comes five-eighths of current mine output. To uncover the ore 1,000,000 cu.yd. of stripping had to be moved, five shovels and fifty trucks being used. Mining is done selectively with the aid of ultraviolet light




**THE BENCHES** are 30 ft. wide and 30 ft. in height. This plan drawing shows the layout scheme proposed. The ultimate slope from top to bottom will be 45 deg. Access to the pit is by a road which spirals down on a 6 percent grade

within the shear zone is genetically related to the Meadow Creek fault. The fractures strike N. 45 to 80 deg. E., dip northwest and southeast, and are well exposed in the underground workings. Some of the fractures are tight fissures that are not persistent and have no gouge. Others, such as *A* and *B* fractures, shown in the vertical section taken along line A-A of the plan, exhibit heavy gouge and "flucean,"[1] and are relatively persistent. *A* fracture, along which most of the ore in the mine is localized, strikes N. 75 to 85 deg. E. and dips 50 to 80 deg. N. It is exposed 170 ft. along the strike and 100 ft. along the dip. At its eastern end, it splits into several branches trending in northeasterly directions, and eventually disappears or merges with other nearly parallel fractures. The western end of *A* fracture has not been reached. Where it appears in the face of one of the drifts it gives no indication of "dying out." Followed upward along the dip from the main level, the *A* fracture flattens toward the southeast and splits into several minor fractures. It is characteristic of these northeast fractures to flatten when followed upward along the dip. The *A* fracture has not yet been found in the workings on No. 3 level. *B*, *C*, and *D* fractures have been exposed for various distances from 100 to 200 ft. along the strike and 50 to 200 ft. along the dip. Slickensided stibnite on surfaces of some of these fractures indicates that at least the latest movement has been post-mineral.

The Hennessey fault (seen in the vertical section) is a part of the Yellow Pine shear zone. It strikes N. 15 to 27 deg. E. and dips nearly vertical. It contains gouge, breccia, and "flucean," and varies in width from 1 to 15 ft. Some of the breccia fragments have been well rounded by movement. The latest movement was normal and post-scheelite. What effect the fault had in displacing the tungsten orebody is not yet clear, however.

Minerals in the ore zone are stibnite, scheelite, gold, and silver. Pyrite and arsenopyrite are the principal sulphide minerals. Other minerals not of direct economic value include quartz, plagioclase, microcline, muscovite, sericite, and dolomite.

The typical ore is a breccia of angular fragments of scheelite and mineralized quartz-monzonite cemented by a matrix of fine-grained stibnite. Commonly, the scheelite fragments include angular fragments of quartz monzonite. Veinlets of stibnite indiscriminately crosscut the scheelite and quartz monzonite. In color, the scheelite is cream to straw-yellow, the quartz monzonite fragments are white

[1] The scaly, intimately sliced rock shavings of the shear zones.

to light gray, and the stibnite is metallic dark gray. The main body of tungsten ore contains 2 to 4 percent tungstic oxide ($WO_3$), about 5 percent antimony, 0.08 oz. gold, and 1.25 oz. silver. Currently, some 250,000 tons of 2 to 4 percent tungsten ore and 500,000 tons of 0.7 percent tungsten ore are blocked out, and prospects for developing an even greater tonnage are excellent.

Along the Meadow Creek fault, south of the Yellow Pine shear zone, are the Meadow Creek and Fiddle Creek deposits. The Sugar Creek orebody, too, may be on the same fault zone, as are several other small prospects to the northeast. Localization of the most important orebodies along the Meadow Creek fault supports the conclusion that it is the major ore control. The gold was distributed throughout the Yellow Pine shear zone with apparent disregard for the dacite dike, but the tungsten and antimony ores are confined almost entirely to the block west of the dike. In two places where small sections of antimony ore have been found to the east, they occur adjacent to a break in the dike. A small amount of scheelite is found in two drill cores taken from Sugar Creek orebody, which is 900 ft. northeast of the Yellow Pine shear zone, but insignificant in quantity relative to the size of the main tungsten deposit. These small amounts of scheelite and antimony may have found their way through one or more small breaks in the dike. It is difficult to explain the long, unbroken segments of dike in a zone of such widespread fracture if the dacite dike is pre-antimony. Perhaps further development work will cast light upon this problem. The zone of N. 45 to 85 deg. E., of which *A* and *B* fractures (see vertical section) are a part, appears to have guided the tungsten-bearing solutions. The scheelite in the area now stoped occurs in an apparently tabular body dipping flatly to the west toward *A* fracture. Ore to the north and south, however, may be localized by other fractures similar to *A* and *B* fractures.

The early sulphites—pyrite and arsenopyrite—are thoroughly disseminated in microscopic grains throughout the quartz monzonite of the shear zone. They selectively replace biotite and sericitized plagioclase to a limited extent. The abundance of the early sulphides within the Yellow Pine mine is related to the degree of shearing. Although all gold apparently is inclosed in the early sulphides, no coincident distribution of sulphides and gold is observable. There are masses of high-grade gold ore and masses nearly barren of gold, independent of the amount of sulphides present.

The scheelite ore occurs in several ways—namely, in mineralized breccia zones where gold ore fragments are imbedded in a scheelite matrix; in inclusion breccia zones, where scheelite fragments are imbedded in a matrix of fine or coarse-grained stibnite; in nearly pure stringers that occupy dilatant partings in the host rocks; and in haphazard disseminations in the country rock. The best grade of ore comes from the inclusion breccias of scheelite fragments in stibnite. In every case, high-grade scheelite ore is found to accompany high-grade stibnite ore.

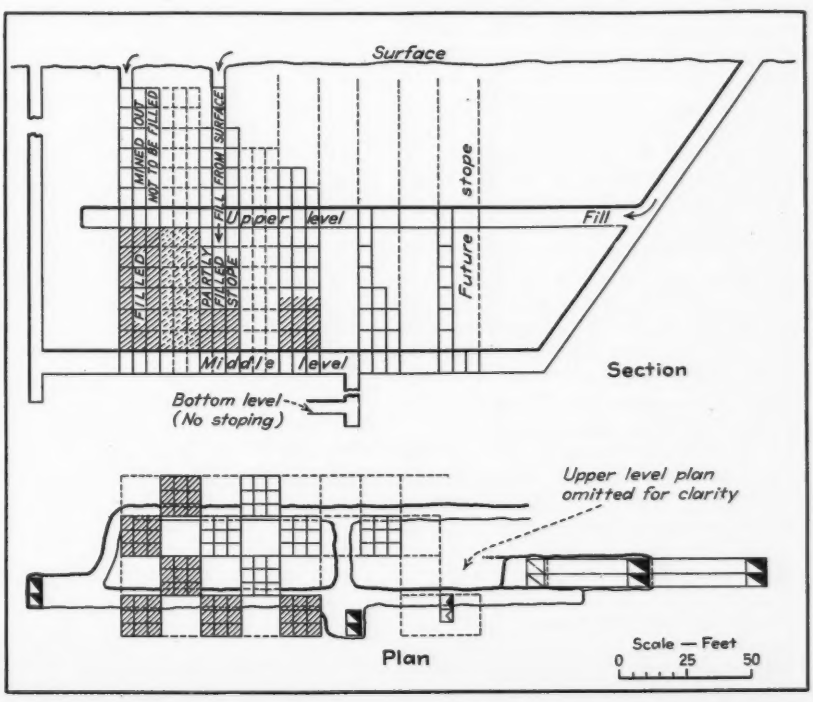
The stibnite ore occurs (1) as veinlets, where commonly it is closely associated with pyrite, arsenopyrite, carbonate, and vein feldspar; (2) as nearly pure stringers; (3) disseminations in which it commonly replaces the mica of the quartz monzonite; (4) fracture coatings; (5) euhedral crystals in zones of recent fault movement; and (6) as cement in brecciated areas as discussed in the preceeding. Near the surface, stibnite is oxidized to reddish kermesite ($Sb_2S_2O$), and to other yellow and white antimony oxides. Silver is present in the ore in small amounts, and evidently closely associated with the stibnite. The silver-bearing mineral has not been determined, but it may be a sulphantimonide.

Introduction of the pyrite, arseno-

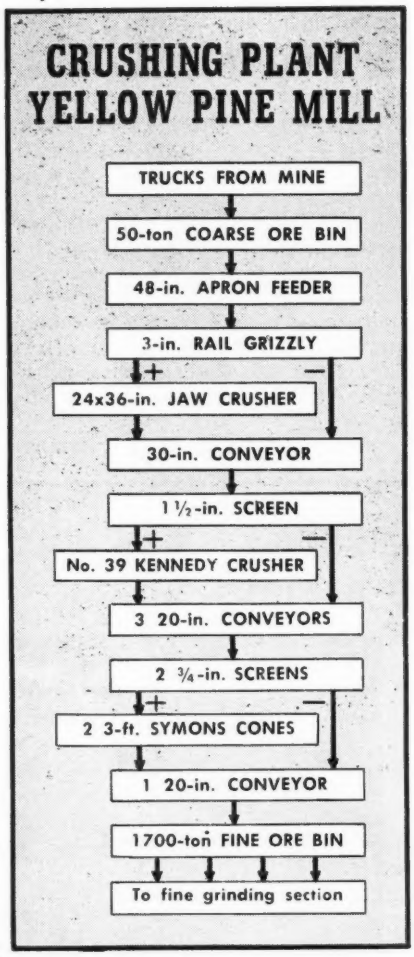
## UNDERGROUND MINING OPERATIONS

**SQUARE-SET MINING is used underground. The two-man crew, consisting of miner and helper, does all the work**

**MUCKING on the two lower levels is done with mechanical loaders, as here. Slushing is used on the upper level**




**FOR MINING THE ORE the ground is divided into 15 x 15-ft. blocks extending from the middle level to surface. In a new stope, after raising to the upper level or to surface, horizontal slicing is begun at bottom. Finished, the stope is filled**




**SIZE REDUCTION in comparatively short stages as above, tends to minimize slimes and aids subsequent scheelite flotation**

pyrite, and gold probably was the earliest mineralization, possibly arriving in two or more surges of mineralization. Lack of a consistent tenor of gold in the sulphides may suggest the theory that they were deposited at different times, but in no way proves it. With an appreciable lapse of time between the entry of the sulphides and the entry of gold, permeability may have altered sufficiently to separate the two slightly. The gold-bearing solutions evidently arose along the Meadow Creek fault until they encountered the Yellow Pine shear zone, and the gold was localized there. The tungsten-bearing solutions evidently, also, arose along the Meadow Creek fault until they encountered the zone of Northwest fractures, and precipitated scheelite along it. The antimony-bearing solutions probably arose along the same zone, and stibnite was deposited in small fractures without control by major structures except the lamprophyre dike on the west and the dacite dike on the east. Small fractures, of course, had considerable control upon the localization of the antimony ore.

## MINING

Mining operations are carried on simultaneously underground and on the surface. Some 800 tons of ore is mined daily, with 300 tons coming from underground workings and 500 tons from a pit. About 1,000,000 cu.yd. of glacial till was removed from the top of the orebody before open-pit mining started. Five shovels were used—namely, a B-E 44-B, 2-cu.yd. unit; B-E 20-B, ¾ cu.yd.; Lima 6-ELH, 1¾ cu.yd.; Northwest 20, ¾ cu.yd., and a Northwest 20, ⅝ cu.yd. Additional pit equipment included three International TD-18's; a Cletrac DD; Cletrac FD; two Caterpillar RD7's; with two RD6's and one RD8. Haulage of waste to the dumps was done by 25 Cummins diesel trucks and 25 gasoline trucks.

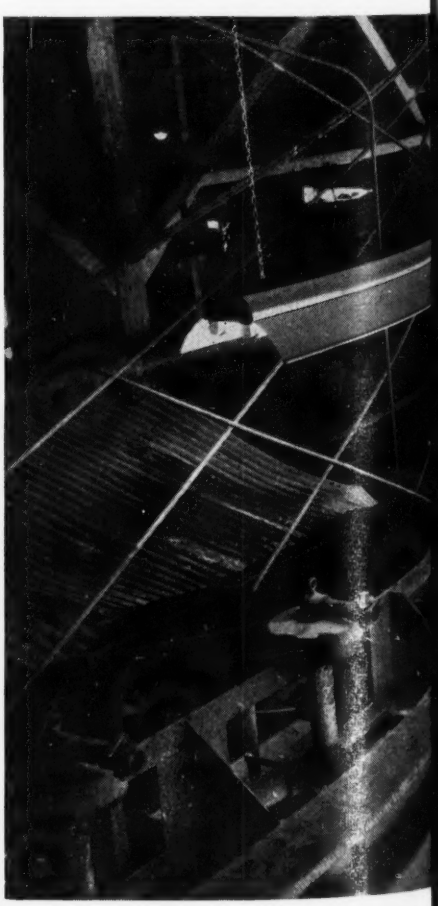
The pit proper is worked in level benches 30 ft. wide with 30-ft. faces. Ultimate over-all slope (top to bottom) will be 45 deg. The access road starts at the south end and spirals downward on a 6 percent grade to the bottom. Ore is mined selectively. All benches are lamped with fluorescent lights, and tungsten-bearing areas are marked and blasted separately from areas barren of scheelite. After each blast, the broken ore again is lamped before haulage to mill or stockpiles.

One G-D D99 and four I-R X71 wagon drills are used for drilling the benches. Eighteen-foot to 24-ft. horizontal holes are drilled with 1¼-in. round steel and Timken bits. The bits used vary from 2⅞ in. to start the hole down to 2 in. to finish it. Large boulders are blockholed in the pit with I-R C49 jackhammers using 1-in. hexagonal steel with forged-on bits. The highly sheared nature of the ground makes it unnecessary to drill vertical holes, except when a new bench level is established. Horizontal holes are loaded with Gelex No. 2, and vertical holes with duPont "Red Cross" No. 4 free-running powder. Compressed air for the drills is furnished by two 500-cu.ft. I-R compressors; a 315-cu.ft. I-R compressor, and a 360-cu.ft. G-D compressor, all portable. The shovels used in stripping serve also for loading broken ore and waste into trucks, and the trucks and tractors are employed in current mining work. About 300 g.p.m. of water from drainage constantly enters the pit. The water is bypassed through the mine and pumped up one of the old stopes.

Cost of breaking in the open pit and loading into trucks is 28c. per ton, which includes 10c. per ton for stripping.

The underground workings are distributed over three levels, and consist of a 175-ft. vertical shaft, a 165-ft. inclined shaft, a 103-ft. vertical winze, 4,000 ft. of drifts and crosscuts, and several raises and stopes. I-R DA30 and DA35 machines are used in crosscutting and drifting. Fifteen to twenty holes, using a V-cut, are drilled in establishing lateral workings with a 6x8-ft. cross-section. Broken ore on the lower two levels is loaded with Eimco Model 12B loaders, and I-R Model 4NNOJ slushers are used in the drifts and crosscuts on the upper level. The ore on the upper level either is scraped into transfer raises or loaded directly into 18-cu.ft. end-dump cars by using a slusher and ramp. In the lateral headings about 6 tons per man-shift is produced at a cost of $2.78 per ton. The drifting crew consists of a miner and helper on one shift, and a loader operator for half of the next shift. Drilling in the square-set stopes is done with I-R R58 stopers, with the stope crew comprising a miner and a helper on each shift. The two do all the mining, mucking, timbering, and filling in the stope.

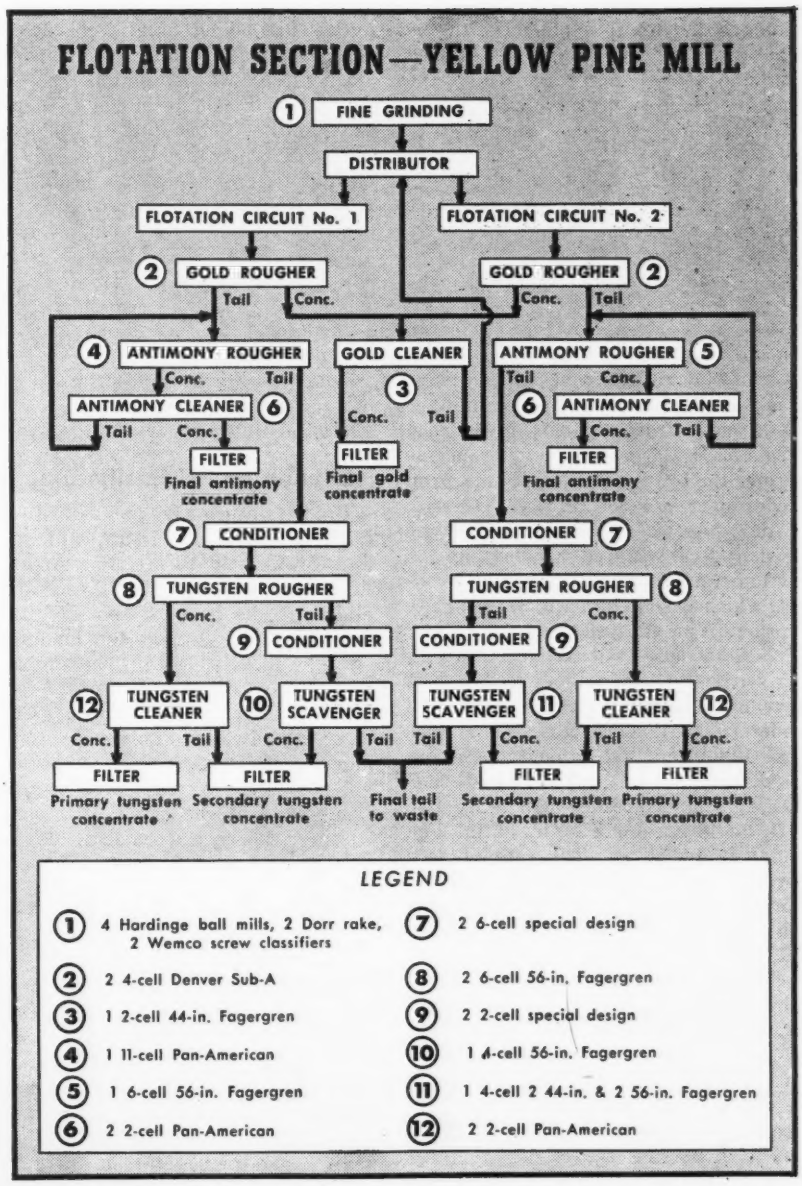
The orebody is divided into vertical blocks 15 ft. square and extending from the middle level to the surface. In starting a new stope, a vertical, two-compartment raise is driven from the middle level to the upper level or to the surface. When the raise is completed, operations shift to the first floor, and the block is mined out in a series of horizontal slices. Stope sets



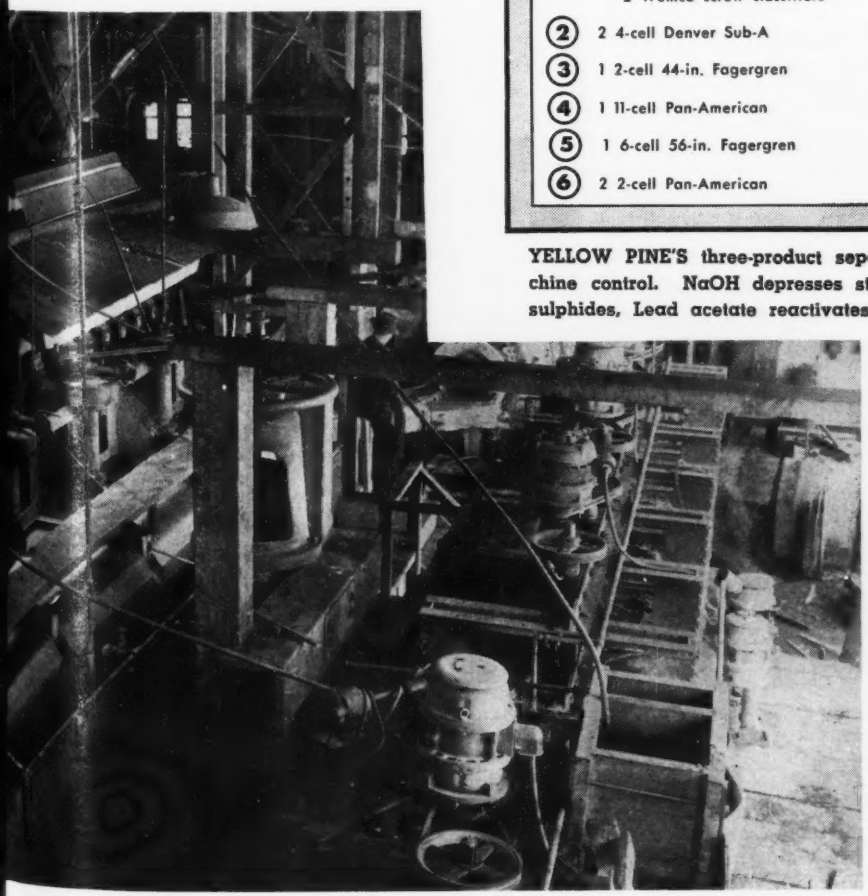
measure 5 x 5 ft. x 7 ft. 9 in. They are made from local Engelman spruce. The sill floor posts are 9 ft. long over all, stope posts 7½ ft., caps 5 ft., and girts 4 ft. 8 in. A worked-out stope is filled with glacial till, which is either brought down the waste compartment of No. 2 shaft to the upper level and hand-trammed to the stopes, or dumped directly into the stopes from the surface. The stopes are filled only to the upper level. Stope production per man-shift amounts to 6.75 tons at a cost of $1.75 per ton. A bonus system was established recently based on payment by the company for all tonnage produced by the mine over a certain amount. The first month after installation of the system, the output per man-shift increased 22 percent at a cost increase per ton of 8.7 percent. The over-all tonnage per man-shift, including maintenance men, is about 5, and the over-all cost per ton of ore mined $2.25.

## MILLING OPERATIONS

History of the metallurgy at the Yellow Pine mine has been extremely varied. The objective, in most cases, on its original basis, was the separation of stibnite from the arsenopyrite and pyrite containing gold. At various times different methods were used. The flowsheet of the original plant was based on laboratory work done in Berkeley by Dr. L. H. Duschak. It involved use of clorox to depress gold while floating stibnite. In 1934, Fred Brinker discovered the applicability to the local ores of the process now known by his name, which is still used with variations. It is based on grinding in a strongly alkaline circuit with sodium hydroxide to depress the stibnite, simultaneously adding copper sulphate to activate the pyrite and arsenopyrite. Adding these reagents together in the ball mill formed the so-called blue-gel, which may or may




**YELLOW PINE'S three-product separation demands exact reagent and machine control. NaOH depresses stibnite to permit flotation of gold-bearing sulphides, Lead acetate reactivates stibnite, and oleic acid floats scheelite**



**ANTIMONY FLOTATION section of Yellow Pine mill. Note fluorescent lighting over Pan-American cells at left. Good light means better operation, necessary in delicate separations such as this one**

not have had anything to do with the separation. At any rate it is still used fundamentally. After floating the pyrite and arsenopyrite, lead acetate was used to reactivate the stibnite possibly by coating the surface with lead sulphide. Addition of large amounts of copper sulphate produces the same effect but not as efficiently as does the lead acetate.

As to the present metallurgy, the pit ore varies in size up to pieces 3 ft. in longest dimension. It is hauled to the mill in 10-ton trucks and dumped onto a stockpile, from which point it is bulldozed into the crusher hopper by a small tractor. This gives easy access to a large supply. From the hopper the ore is fed by a 48-in. apron feeder over a steel grizzly. Oversize of this goes to a 24x36-in. Blake-type crusher to be reduced to about 3½ in., the undersize joining the crusher product, which is sent to a No. 37 Kennedy crusher. This unit reduces it to about 1½ in. and delivers it to 3x6-ft. vibrating screens. Oversize goes to two 3-ft. Symons standard cone crushers and undersize to fine-ore bins. These bins have 1,900 tons' live capacity. The ore is discharged on to conveyor belts feeding four Hardinge ball mills, two 8 ft. by 48 in., one 8 ft. by 36 in., and one 7 ft. by 36 in. The rate of feed for the two largest units is 9½ to 10 tons per hour, for the 8 ft. by 36 in. mill 8½ tons, and for the smallest 7½ tons per hour.

Sodium hydroxide, copper sulphate, and reagent No. 301 are added to the ball-mill feed. Consumption per ton of ore treated is 1 lb., 0.3 lb., and 0.05 lb. respectively. The caustic serves a dual purpose: (1) it depresses stibnite, as mentioned; (2) it has a dispersing action on the pulp, thereby producing a finer ball-mill discharge and avoiding the possibility of sanding the classifiers.

There are two Dorr duplex classifiers and two Wemco screw classifiers, all in closed circuit with the ball mills. The return load in the grinding circuit is about 500 percent of the original feed. The water used in the circuit is that employed for cooling in the diesel power plant. Classifier overflow temperature is about 50 deg. C. Use of hot water has been found to reduce reagent consumption considerably. Classifier overflow usually runs between 10 and 15 percent plus 100 mesh, the material of this size appearing to be mostly quartz grains from the granite. This product is pumped into a mixing tank and distributed as desired to either of two separate flotation circuits.

First in the flotation line-up is the gold circuit consisting of eight 43-in. Denver cells. Save for the frother, which is duPont B-23 alcohol (0.07 lb. per ton), no additional reagents are added to this circuit. The rougher gold froth goes to two cleaners, to which sodium hydroxide may or may not be added to depress the stibnite, depending on the grade of gold concentrate desired. The cleaner tails return to the head of the gold circuit. Amount of gold concentrate recovered is about 1 ton per 100 tons of feed. The amount of gold contained varies from 1.5 to 2.5 oz. per ton, the insoluble usually being up to 5 percent. The amount of silver in the concentrate depends entirely on the quantity of antimony, but in general is not more than 10 oz. per ton. Flotation time is 6 to 7 min.

### Stibnite and Scheelite Floated

Gold tailings are pumped directly into the antimony circuit, which consists of nine 90-cu. ft. Pan-American flotation machines. Lead acetate is added at the head of the circuit, the amount depending on the amount of stibnite to be floated. The theory is that in an alkaline circuit a soluble antimony surface will be replaced by a relatively insoluble coating of galena. This reaction is easily seen and is one of the best examples imaginable of the effect of a surface coating. There can be little doubt as to what is taking place when one sees the reaction; nevertheless, there is some controversy about this. Similarly, though to a lesser extent, with copper sulphate.

Reagents used in the antimony circuit include reagent No. 301 (0.15 lb. per ton), and B-23 for the frother. The first four cells produce concentrates which run about 5 percent more in antimony than the cleaner concentrate from the remaining cells. The main operating factor in this circuit is to control the amount of lead acetate used, this varying proportionately to the amount of antimony floated. Likewise, more frother must be added. The cleaner tails return to the head of the antimony circuit. Flotation time is 20 to 25 min., and the amount of concentrate produced is about 7 tons per 100 tons of mill feed. Finished concentrate runs 50 to 55 percent antimony, 15 to 20 oz. silver, and 0.15 to 0.20 oz. gold.

Scheelite flotation is done in a very alkaline circuit. The pH after conditioning will run between 10 and 10.5.

Conditioning for the scheelite circuit is done in a bank of 12 rectangular wood tanks made very much like flotation cells, with a sand bleeder on the bottom to effect complete circulation. Into the first two cells of the conditioner are added the reagents for controlling the alkalinity as well as those for depressing undesirable constituents. Soda ash and caustic, added in amounts of 5 lb. and 2 lb. per ton respectively, belong to the first category; the depressants used per ton are: quebracho, 0.15 lb.; and sodium silicate, 1 lb. The conditioning continues 5 to 7 min. To the third conditioner cell is added oleic acid at about 0.75 lb. per ton, and either Kemenol or Aerosol OT in the amount of 0.2 lb. per ton. After conditioning for another 12 min., the pulp is pumped to the first scheelite rougher. The scheelite circuit comprises a series of twelve 56-in. Fagergren flotation machines. Every other cell receives a small amount of either Kemenol or Aerosol to maintain the froth. The froth from the first two cells will generally run upwards of 50 percent $WO_3$, and it is planned to send it direct to the concentrate thickener. However, at the moment the froth from all roughers goes to four Pan-American cleaners. In most cases, the grade of the scheelite concentrate can be readily maintained at any desired point by the judicious use of reagents, the main controlling factor being the amount of oleic acid used. The greater part of the scheelite in this concentrate is minus 200 mesh. Recovery in the first concentrate consists of most of the freed scheelite, and about 70 percent of the total $WO_3$ is contained in it.

A problem is thus presented in recovering the remaining scheelite. It is solved as follows: The tailings from No. 1 scheelite circuit go to a bank of two conditioners to which is added 1.5 lb. per ton of Perkins pine fatty acid oil. The conditioning time is 7 min. From the conditioners the pulp goes to a bank of eight Fagergren cells used as scavengers. In the scavenger concentrate there are some large grains of free scheelite. However, most of the $WO_3$ in this product, which runs about 10 percent $WO_3$, is a middling. This product joins the cleaner tails, and the resulting low-grade concentrate, containing 20 to 25 percent of the total $WO_3$ recovered, is shipped for refining to the U. S. Vanadium Co., agents for Metals Reserve Co., in Salt Lake City.

Summing up the operation as a whole, we may say that there are two factors which control the whole flotation circuit—namely, alkalinity and a thoroughly dispersed pulp. Credit for the successful flotation of the scheelite in this ore must be given to L. H. Lange, of the Galigher Co., of Salt Lake City, Utah.

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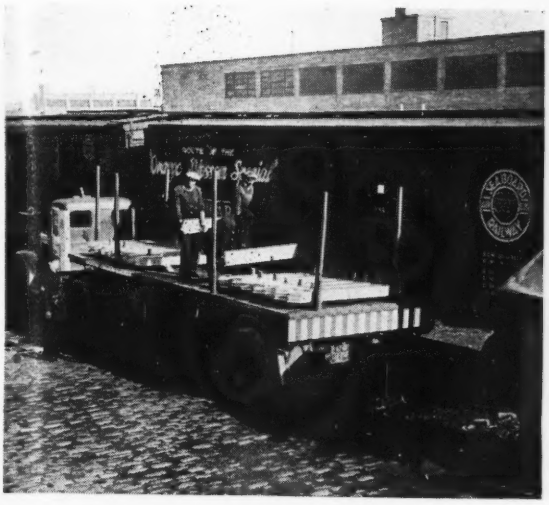
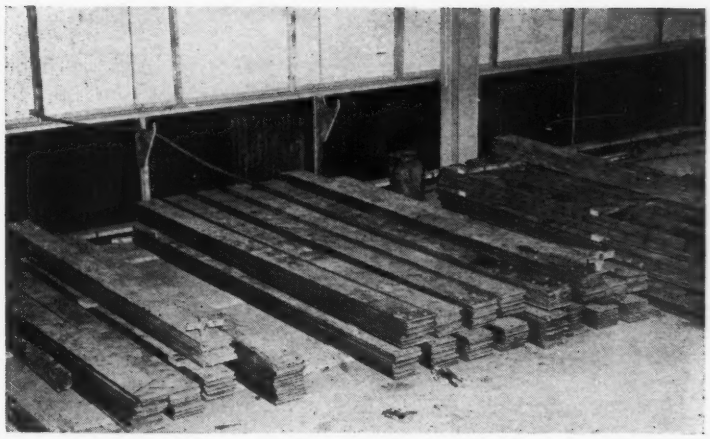


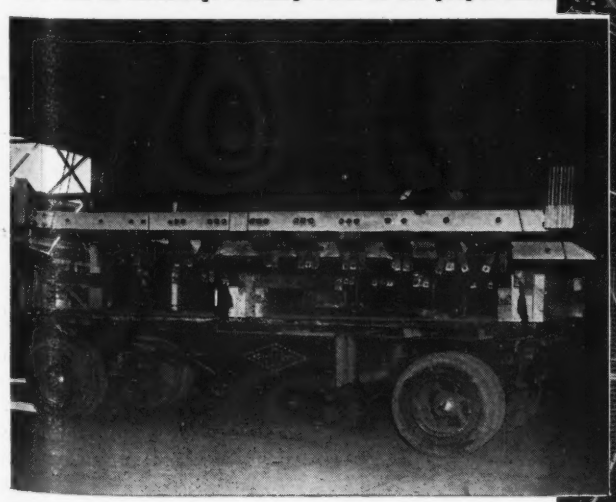
The silver, converted by smelter and fabricator into rolled and punched busbar, is unloaded and stacked up at the plant, awaiting fabrication. Photos by courtesy of Aluminum Company of America



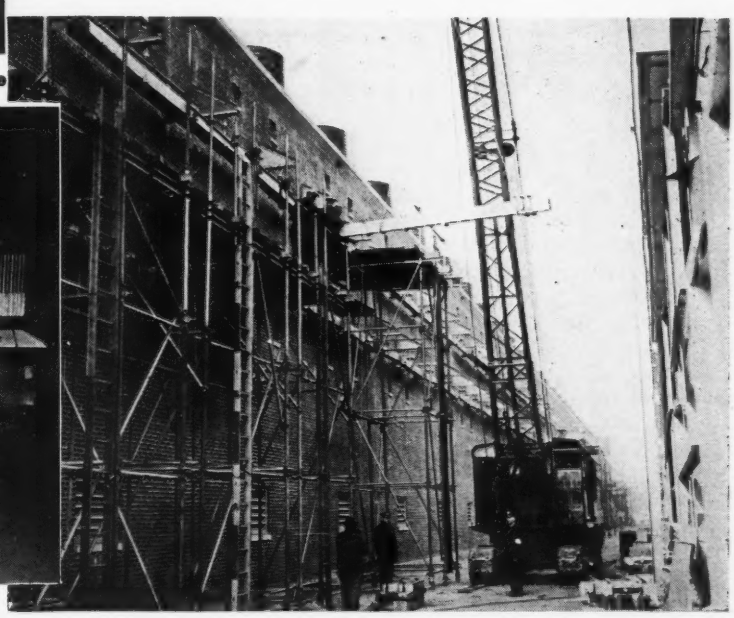
# Precious Metal in Wartime Role

*Here some of the U. S. Treasury's hoard of silver, on temporary loan, is seen in the process of transformation into busbars for electrical service at one of the new aluminum plants. Spectacularly humble, this use is feasible because of the metal's superior conductivity.*

A detail in assembly. Bending a bar to the proper curve

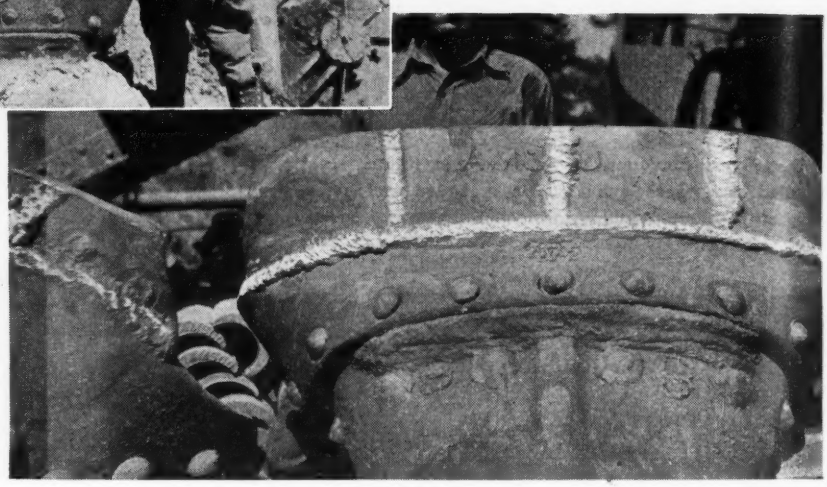


Silver ring busbar, fabrication completed, is delivered to the potroom of the aluminum plant



Erecting silver bus on the outside of the rectifier building

Operating line of re-lipped buckets. R. W. Setzer, dredgemaster, stands beside the line. During four months of service these repaired buckets have excavated 1,200,000 cu. yd. of gravel



Close-up of bucket lips built up with salvaged manganese steel fragments. To re-lip a new bucket line, 14,800 lb. of scrap and 2,200 lb. of welding rod were used, a saving of 29,600 lb. of new steel

# Dredge Bucket Renewal Conserves Manganese Steel

**Charles H. Thurman**
*President-Manager*
*Thurman Gold Dredging Co.*
*San Francisco, Calif.*

To ASSIST in the present war effort and carry out the demand for careful conservation of equipment and materials, a novel method of utilizing scrap manganese steel to restore worn units on the 8½-cu.ft. bucket-line dredge operated by the Thurman Gold Dredging Co. near Reading, Calif., has been developed and put into service by R. W. (Bob) Setzer, dredgemaster. From a pile of scrap discarded dredge bucket lips, sections of various widths, lengths, and thicknesses were cut with an acetylene torch and electric-welded to worn-out, manganese-steel lips. Some three or four pieces of scrap were required to bring one worn-out lip up to standard height at the cutting edge. The thickness of the lips averages from 1½ to 2 in., and there are 74 buckets in the complete line. As the average weight of one new lip is 400 lb., a total of 29,600 lb. of new manganese steel was conserved by using about 14,800 lb. of scrap manganese steel and 2,220 lb. of manganese welding rod. Only about 200 lb. of a new lip can be worn off before it is discarded, with the remaining 200 lb. going to the scrap pile.

The difference between the cost of a new lip and a rehabilitated lip on this particular job was $35.45. Thus in addition to conserving several tons of manganese steel there will be a saving of about $2,600 in the cost of one bucket line over a period of eight months. The lips take impact with the gravel and clay once every 2½ minutes. In addition to reconditioning worn-out bucket lips as described in the aforegoing, Mr. Setzer has been quite successful in rehabilitating worn-out and broken manganese-steel bucket bottoms. His success in electric-welding broken manganese-steel bucket bottoms, hoods, and front and back eyes can be attributed entirely to proper heat control. The entire section to be welded is first preheated to a degree higher than will be reached during the welding procedure and the weld is completed in one continuous operation without stopping or allowing the section being welded to cool off in order to avoid shrinkage stresses in the welded area. Large sections of scrap manganese-steel bucket bottoms (with hoods cut off) are being used "bottoms up" in the main dump hopper to take the pound of gravel at an average rate of 447 cu.yd. per hour on the dredge. In this manner several tons of steel is saved annually in the hopper alone.

Accompanying photographs show close-up of the rebuilt lips on two buckets, and several rebuilt lips in a section of the bucket line after four months of service during which 1,200,000 cu.yd. of gravel and clay were excavated. When necessary a bucket bottom is "half-soled" where it takes wear from contact with the upper tumbler propelling the bucket line.

# United Feldspar's Pyrophyllite Enterprise

*A simple flowsheet is used in preparing this non-metallic mineral for market*

IN ADDITION to feldspar, topaz, olivine, quartz, and mica, the United Feldspar & Minerals Corp. is actively interested in pyrophyllite, a mineral that in recent years has come into good demand as a constituent in the batches for making ceramic bodies, enamel frits, insecticides, and cosmetics. Pyrophyllite is a non-metallic mineral suggestive of talc in some respects, particularly in its greasy feel, but being, among other differences, a hydrous aluminum silicate, $H_2Al_2(SiO_3)_4$, whereas talc is a magnesium silicate. United Feldspar's subsidiary, Carolina Pyrophyllite Co., for some years has been exploiting a deposit of this mineral occurring on Soapstone Mountain in Randolph County, N. C., about 200 miles east of the Spruce Pine area, where the parent company has its headquarters and is engaged in its chief activity of mining and grinding feldspar.

This deposit was opened in 1927 by Paul Gerhardt, who worked it for a year or two. It was then shut down and remained so during the worst years of the depression. Becoming interested, United Feldspar acquired the property in 1935. The pyrophyllite mined was shipped to its Minpro plant, in the Spruce Pine region, where it was ground, until the present plant of Carolina Pyrophyllite Co. was put up in the fall of 1937. The subsidiary had been organized in 1936. The present plant is second-hand, though in excellent condition. Previously the structure had housed the Black Fox plant of the Southern Silica Mining & Manufacturing Co., at Cleveland, Tenn., from which location it was moved on being purchased by United Feldspar. It is of steel and is covered with Truscon sheet steel. The building is of moderate size but adequate for handling the product of the mine. It stands about 800 ft. from the highway and is 4 to 5 miles from the mine.

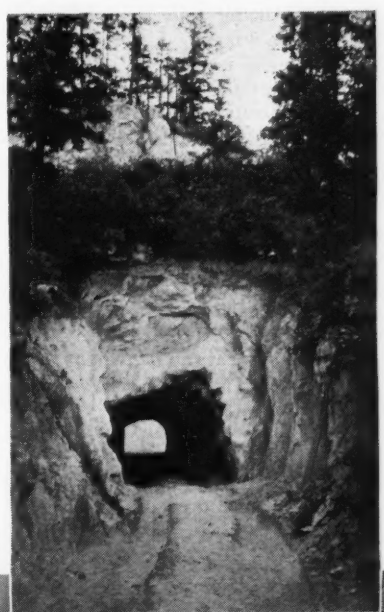
The mine is an open pit and is entered through a short tunnel, 8x10 ft. in cross-section and about 100 ft. long which cuts through the side-hill slope. The walls of the pit are steep, practically vertical in part, and are about 100 ft. high at their highest point. In horizontal dimensions the pit is approximately 50 ft. wide and 150 ft. long. This excavation is entirely in the pyrophyllite, neither hanging wall nor foot-wall being exposed at any point. At the hanging wall of the deposit where penetrated by the tunnel there is a streak of sericite, which is mined separately.

Over the pyrophyllite, where mined, there is practically no overburden. Operations at the mine are conducted by a contractor. Drilling is done with air drills, usually an S68 jackhammer, supplied from an air compressor outside the tunnel. The broken pyrophyllite is loaded by hand into 6-ton trucks belonging to the contractor. At the time of visit, the output had been running about 12 to 15 such truckloads in an 8-hour day.

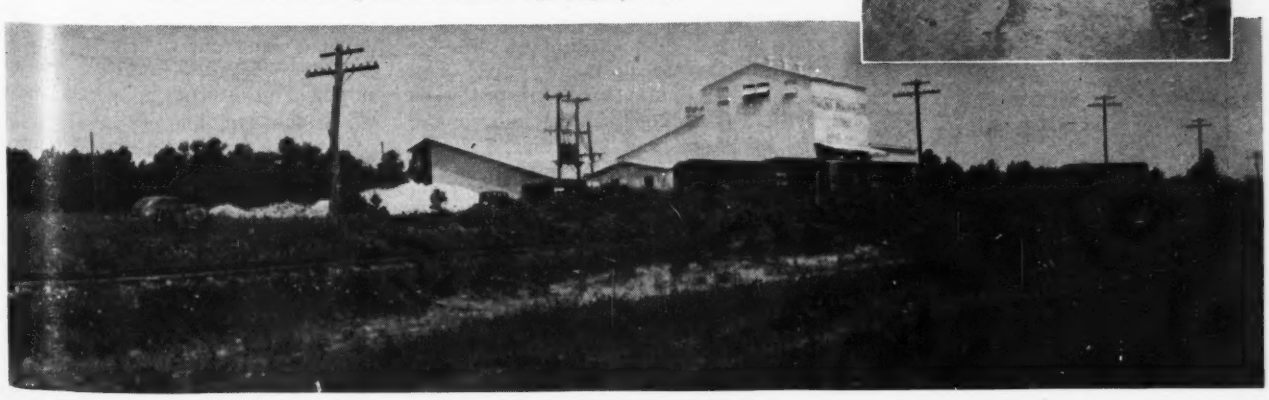
Trucks deliver directly to the plant, either to open storage immediately next to it or to any one of seven bins, or open-front stalls (formed by wooden partitions) which are provided in a row directly back of the plant. Six of the seven bins contain standard material. The seventh is used for holding off-color pyrophyllite, ground as No. 3 grade for insecticides, rubber, and other uses where white color is not essential.

Grades of rock delivered are: (1)

**The open pit is entered by means of a short tunnel through the side-hill slope**



**A distant view of the plant of Carolina Pyrophyllite Co.**

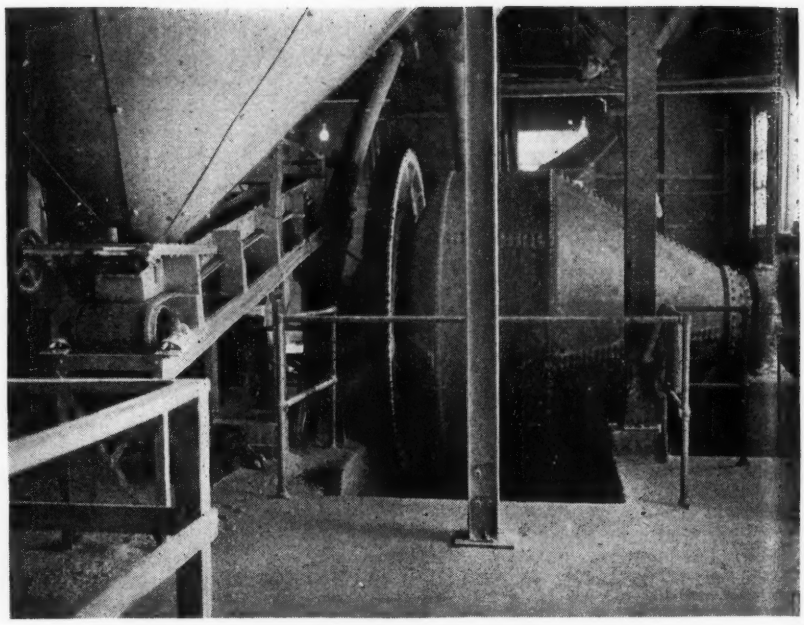


Standard-grade pyrophyllite; (2) sericite, which is more or less experimental; (3) No. 24 enamel grade; (4) off-colored material used in the rubber trade. These grades are not blended but are handled separately in the mill, various products being made from each in meshes ranging from 80 to 325. (Some topaz from the Brewer mine, in South Carolina, is also stored.) About 800 to 900 tons of standard rock is kept on hand and from 200 to 300 tons of off-color material.

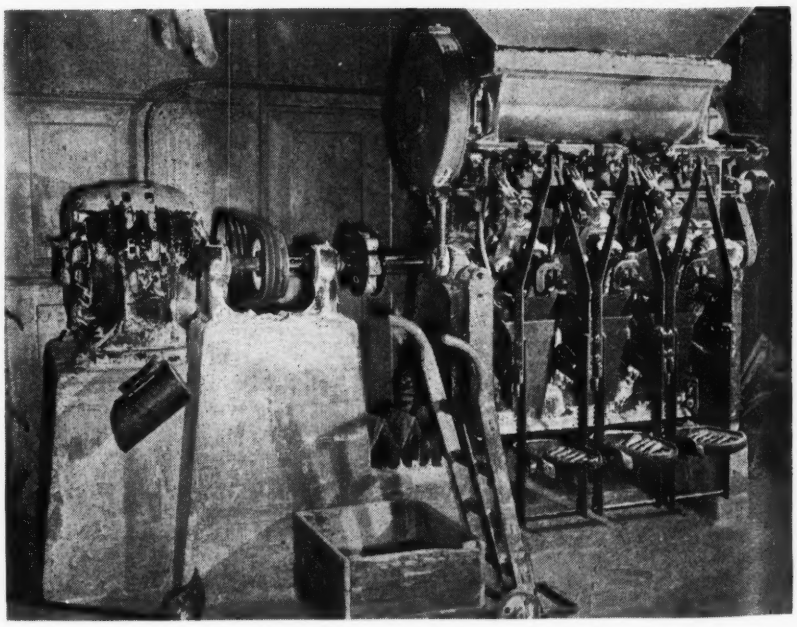
Standard-grade rock is hand-sorted at the mine to remove the off-color material so as to preserve the white color. Wheelbarrows, either at the bins or in the storage yard, are used for delivering the rock to the crusher hopper. A tined fork having 12 tines with 1-in. spacing is used for screening out the fines, which are useful in keeping the roads repaired. If the fines are clean they may occasionally be added to the crusher. The standard grade is a product which, when finished, will run 20.5 percent $Al_2O_3$, with an iron content no greater than 0.09 to 0.10 percent.

Analysis of the contents of each bin is made and maintained. Mill runs are made to fill specific orders only, grinding being done for storage (save that a car or two of ground enamel-grade material may be accumulated), one reason being that finished storage space is lacking. All the enamel-grade material is used at 140 mesh, so the management knows what to expect. A wheelbarrow of 500-lb. capacity is used, to facilitate feeding a definite, known tonnage to the crusher and to get a correct mix.

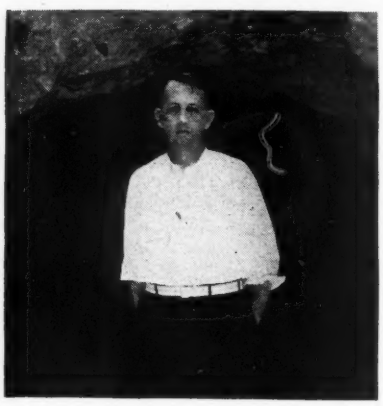
The flowsheet is simple. After the crushing, the mill is divided into two units. Crushing is done in a 12x24-in. Reliance jaw crusher set to 1 in. This is driven by a 35-hp. motor through a multiple-V-belt drive. Pyrophyllite is said by the local management to be comparatively hard to crush, being rather tough. The bigger pieces tended to ride the crusher until a larger machine was installed. The crushed material is conveyed and elevated to two 50-ton steel surge bins, one for each of the mill units.



In the mill—a surge bin, feeder, and conical grinding mill



Bagging machine in mill



F. P. Buckels, office manager, at pit end of tunnel

The two units are equipped each with a Hardinge conical mill, one 8 ft. by 36 in. and the other 8 ft. by 80 in., each being followed by a 14-ft. Gayco separator. Oversize from each separator is sent back to the corresponding mill. The finished material is delivered to a finished bin, from which it is shipped in bulk or bagged on a Type 107FC St. Regis Paper Co. (New York) bagger driven by a 15-hp. induction motor. This bagger is fed by a chute from each bin.

Bagged material is shipped in paper-lined burlap or in paper bags. The latter are three-walled in the 50-lb. size and four-walled in the 100-lb. size. Bagged material pending shipment is stored in a room about 40 ft. square.

For bulk loading, a screw conveyor delivers to a canvas chute supported by a hinged launder. The railroad car is prepared for loading by placing 5-ft. oak boards across the doorway and lining the sides with paper, which is also placed on top of the load. The load line for pyrophyllite runs 3½ to 5 ft. above the floor, depending on the tonnage.

Previously the Hardinge mills were lined with Belgian flints. The supply of these having been exhausted, the company is using Salisbury granite blocks. (See *E.&M.J.*, November, 1942, p. 61.) Some Minnesota jasper had also been tried but was found too soft. Similarly Salisbury granite is used for the grinding media in place of the Belgian pebbles formerly used.

The plant is working three shifts with three men per shift, or a total of nine, not counting the mill superintendent. A 5-day week is worked and on this schedule a large tonnage per month can be ground, the grinding sizes being 80, 100, 140, 200, 230, and 325 mesh. The company has also shipped material crushed to ½ in. and ¾ in. Overtime is worked occasionally.

F. P. Buckels is office manager of Carolina Pyrophyllite Co., under B. C. Burgess, who is vice president in charge of plants for the parent United Feldspar company. H. W. Brinkley is mill superintendent. Homer Hise is mine superintendent and contractor.

# A Process for Briquetting Soft Iron Ores

PATENTS are being sought on a process of briquetting soft iron ores such as are found in the Lake Superior district, or concentrates or similar material. This process adds no binder, which might interfere with proper furnace operation. The process normally consists of four stages, the first being drying to eliminate excess moisture. This can best be done while the material is loose, and also it can be screened easier after drying. Screening is the second step. This material is then compacted into briquettes by using high pressures, and finally a short exposure to intense heat produces case-hardened briquettes.

The initial purpose of the experiments carried out several years ago was to produce a substitute for high-grade lump ore for use as an oxidizing agent in the open-hearth furnace, or for open-hearth charging.

The briquettes as contemplated in the patent application may also make a premium blast-furnace charge, as they appear to offer at least four advantages over soft ore. First, they permit a freer circulation of the blast through the charge, reducing the smothering effect of loose soft ore. Second, they reduce or eliminate iron-ore dust losses which are one factor affecting blast furnace capacity. Third, they permit a greater quantity of iron to reach the hearth, because compacted briquettes have a high specific gravity. Fourth, dehydrated briquettes require no drying in the blast furnace, where heat utilized for this purpose in the utilization of natural soft ores is removed from the molten products. In short, it should be more efficient and economical to dry the ore before charging than to use heat within the blast furnace for this purpose.

These combined advantages suggest the possibility of increased capacity in a blast furnace using a properly prepared charge in contrast to the natural, moist soft ores normally used.

In the experiments conducted the soft ore was first dried and then screened through 100 mesh. How fine it should be screened in commercial practice has not been determined. For briquetting, various pressures were tried, ranging up to in excess of 25 tons per square inch, but pressures above 20 tons were omitted from later experiments. In case-hardening, higher temperatures gave the best results, although temperatures above 2,400 deg. (Fahrenheit) are unnecessary.

A forty-second exposure to the effective temperature range was adequate to produce case-hardening about 3/32 in. deep, and partial recrystallization throughout the mass, which is quite compact although slightly porous. These briquettes bounce when dropped four feet or more on a concrete floor, and those tested had a specific gravity of 4 plus.

By controlling the rate of feed and temperature range, the physical quality of briquettes can be readily controlled. The processing from dry ore or from ore material without excess moisture to finished briquettes should require only a matter of minutes, as the whole process can be carried out on a continuous, mass-production basis.

# Quartz Pebbles for Ball Mill Grinding in Saskatchewan

IN RESPONSE to inquiries concerning a supply of ball-mill pebbles, the Department of Natural Resources of the Province of Saskatchewan, Canada, W. F. Kerr, Minister (Regina, Sask.), has prepared a report on the occurrences in that Province of deposits of quartzite pebbles that can be substituted in grinding for pebbles of Danish or other foreign origin. Though it has been known for years that quartzite pebbles occur in fairly large quantities in southwestern Saskatchewan, not until the present has it seemed justifiable to undertake a limited amount of field work, the chief object at the moment being to examine certain favorable areas for promising deposits near transportation. This field work, which has been only a reconnaissance survey, covered three general areas—namely, Swift Current, Eastend, and Cadillac. Certain typical deposits were examined in each area. These are thought to offer possibilities for commercial development and as starting points for a more intensive study. The survey, it is felt, has brought to light sufficient evidence of the existence of a "practically inexhaustible" supply of quartzite ball-mill pebbles of suitable sizes to meet every Canadian demand in the future.

In the deposits, besides pebbles of quartzite, there are many other sorts of rocks of the same general shape, and often of the same color or shade as the quartzite. This will require careful sorting. Sizing can be effected mechanically but the final selection for purity of stone and shape must be done by hand by intelligent labor, though much can be done to assist through use of picking belts following screening or sizing. Where such work is undertaken it should be placed under the supervision of an experienced man from the start. Otherwise, costly mistakes and possible failures may result; conditions which might easily curtail future markets to the Saskatchewan pebbles. The deposits reported on are definitely within areas where more detailed study should be made by those who may be further interested.

# A Substitute for Cinchonine in the Tungsten Assay

**J. T. Oats**
*Chief Assayer*
*Bralorne Mines, Ltd.*
*Bralorne, B. C., Canada*

ROUTINE ANALYSIS of tungsten ore samples by most assayers has always involved use of cinchonine as the precipitating reagent, but since the beginning of the war, this reagent has been increasingly difficult to obtain. The following method of tungsten analysis was worked out in an effort to replace cinchonine with a more easily available reagent. Rhodamine B, a coal-tar dye, was found to be suitable in all respects, and though the work on it has not been completed, a description of methods found to be reliable may be helpful to those encountering a cinchonine shortage.

Weigh the required amount of pulp, ground to minus-150 mesh, into a 250-ml. beaker, moisten, and add 50 ml. concentrated HCl. Keep hot under cover glass for a half hour, with occasional stirring (Note 1), and evaporate to about 25 ml. Remove from hot plate and add 10 ml. concentrated $HNO_3$. Evaporate to 8 ml. (Note 2.)

Add 100 ml. boiling water, stir well, and keep at boiling point for a few minutes; then add rhodamine B reagent (Note 3), stirring well while doing so. Return to hot plate and boil to promote coagulation of the precipitate. If much insoluble matter is present, set the beaker aside for a half hour to settle. (Note 4.)

Filter on No. 5 Whatman paper, washing twice with hot rhodamine B wash solution, and washing well thereafter with hot 2 percent HCl solution. (Note 5.) Ignore any precipitate sticking to the side of the beaker. Return the filter paper to the original beaker and add the contents of a graduate containing 20 ml. water and 7 ml. $NH_4OH$. Macerate the filter paper and rinse down the sides of the beaker with warm ammonia wash solution. (Note 6.) Replace cover and heat, with occasional stirring but without boiling, for 5 or 10 minutes.

Again filter through No. 5 Whatman paper and wash well with warm ammonia wash solution. This is done into a 250-ml. beaker, and a total volume of 200 ml. should be enough at this point. Evaporate carefully, preferably using a stirring rod to avoid bumping, to a volume of about 100 ml.

Take off hot plate and immediately add the required amount of rhodamine B precipitating reagent. Stir well while adding concentrated HCl, dropwise, until precipitation is permanent; then add two drops more. Add filter paper pulp, stir well, and bring to a boil. After allowing the precipitate (Note 7) to settle a few minutes, filter through No. 32 Whatman paper, washing with hot rhodamine B solution.

Transfer paper containing precipitate to a porcelain crucible and ignite at lowest possible heat which will burn off the carbon. Cool and transfer residue to a weighed platinum crucible and ignite at slightly above 750 deg. C. for 5 minutes. Cool again, add a drop of water and about 1 ml. HF and evaporate to dryness on the hot plate. Re-ignite at 750 deg. C. for 15 minutes, cool in a desiccator, and weigh as $WO_3$.

## Notes

1. The difficulty in decomposing even a scheelite ore is that the insoluble coating of $WO_3$ formed on the surfaces of the tungsten mineral particles inhibits further decomposition of the particle. Frequent agitation of the contents of the beaker tends to rub off this coating and expose a fresh surface.

2. Holding the volume of remaining acid to 8 ml. and then diluting with 100 ml. water, creates a pH suitable for the complete precipitation of $WO_3$, whether a trace or 200 mg. is present.

3. A convenient strength of rhodamine B reagent is made as follows: Dissolve 1 g. rhodamine B (Pract.) in 100 ml. distilled water. Break up any lumps to complete solution. When in solution, bring to a boil and filter through close paper without washing. About 1 ml. of the aforementioned solution will be required for every 10 mg. of $WO_3$ present. An excess of 1.5 ml. should be added, however, and, in any case, at least 2.5 ml. used.

4. Assays containing 2 mg. or less $WO_3$ will not precipitate readily, and require standing for ½ to 1 hour. After bringing to a boil and settling for awhile, it is possible to determine whether an excess of rhodamine reagent has been added by holding the beaker to a strong light. If the supernatant liquid has a purple tinge, precipitation is not complete.

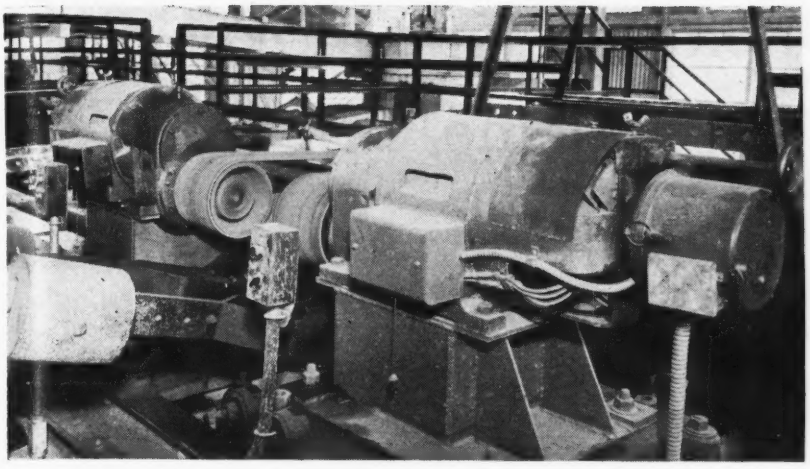
5. For fast work here, I prefer to use a Buchner funnel. To insure no loss of precipitate, I use a double filter, the first of which is a disk cut to the exact size of the inside bottom of the funnel and the second is the 12.5 cm. size. Rhodamine B wash solution is made by adding 2.5 ml. of the rhodamine B precipitating reagent and 6 ml. HCl to 2.1 of water. HCl is used to wash out free rhodamine B.

6. This ammonia wash solution is the same as that used by Scott and is made as follows: To 1780 ml. water add 20 ml. concentrated HCl followed by 200 ml. concentrated $NH_4OH$.

7. The precipitate formed by rhodamine B with tungsten is quite flocculent and when any appreciable quantity of the metal is present it forms at once and settles readily. At this point follow precautions mentioned in Note 4 to ensure completeness of precipitation. If only a few mg. of $WO_3$ are present in the sample, wait until precipitation is complete before adding the paper pulp, after which bring again to a boil and then allow to settle.

With regard to interfering elements, the only serious trouble has been found to be caused by silver, and then only when present in quantities measurable by percentage figures rather than ounces per ton. Mercury, tin, and antimony have a tendency to precipitate, but the addition of a few drops excess HCl, followed by heating, puts them back into solution. Bismuth comes down in both acid and ammoniacal solution, but unless the quantity is enough to occlude an appreciable amount of $WO_3$, it may be ignored. Any great amount of bismuth, however, would have to be washed free of the precipitating reagent, dissolved, and re-precipitated in order to remove all occluded $WO_3$. Other elements tested and found to offer no interference are: Pb, Cu, Cd, As, Fe, Cr, Al, Co, Ni, Mn, Zn, Ba, and Ca. Sr was not tested. Beyond the limits of ordinary qualitative analysis, there may be some elements not yet tested which may interfere, but, with the exception of molybdenum, none has yet been encountered. Molybdenum is dealt with by maintaining a stronger initial acid concentration and by adding rhodamine B to boiling solution.

For those who employ the sodium carbonate fusion method for the decomposition of the ore, I believe this rhodamine B precipitation method will be equally satisfactory. Although I haven't tried it, I did successfully precipitate $WO_3$ from a solution obtained by dissolving ignited $WO_3$ in NaOH. From this solution acidified with HCl, precipitation of $WO_3$ by rhodamine B begins at pH 6.



Two G.-E. 7½-hp. adjustable speed a.c. gear-motors driving rake classifiers. Weighted arms at left maintain belt tension through idler of Lenix drive. Speed is varied by turning handwheel at right

# Variable Rake Speed Improves Classifier Output

**H. S. Maxwell** **W. B. Clark**

*General Electric Co., Schenectady, N. Y.*

With the expectation of increasing mill tonnage and at the same time maintaining satisfactory grinding, a year ago a large Western copper company installed adjustable-speed a.c. motors and gear-motors on its Dorr classifiers, replacing the constant-speed squirrel-cage motors formerly used. Point of separation in these classifiers was thereafter regulated by controlled rake speed as well as by rate of ore feed and dilution.

The several factors governing the point of separation in a classifier may be divided into two classes—fixed and variable. Fixed factors consist of slope of bed and size of settling area. Variables are the rate of ore feed, dilution, and the amount of disturbance imparted to the settling area.

Tests made in 1940 indicated the advantage of controlling the settling rate by rake speed. As a result, 7½-hp. adjustable-speed a.c. gear-motors were installed for individual drive of 24 primary classifiers, 21 primary classifiers remaining unconverted. Individual 7½-hp. gear-motors now drive 39 secondary classifiers, and twelve 30-hp. motors drive 72 more in groups of six.

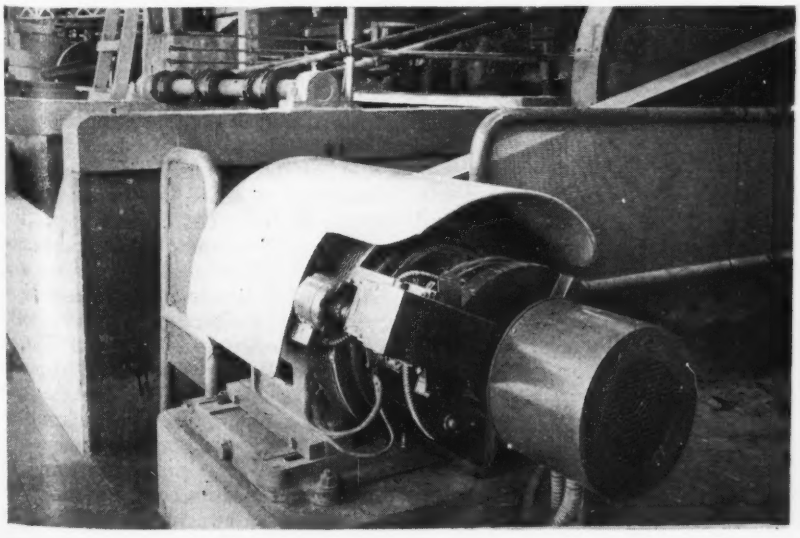
At the time the variable-speed motors were being installed other equipment changes were being made, so that an exact summation of the effect of variable-speed classifier rakes cannot be made. However, important operational facts have been observed.

Under constant rake-speed operation, a change to soft ore occasioned operating restrictions. The soft ore, being slow to settle, caused surging sand loads with increased oversize in the classifier overflow. Greater classifier dilution usually taxed the capacity of the subsequent thickener system. In treating the hard type of ore, characterized by rapid settling, finished particles were returned for regrinding, thus reducing the capacity for new feed. The only control over these conditions was the regulation of solids by adding or cutting classifier water. This manipulation was slow in action because of manual operation and consequently gave a wide range in circulating loads, which varied for a 24-hr. period between about 1,000 tons for soft ores and 3,000 tons for hard ores.

By use of variable-speed rakes, the settling rate may be further controlled and the maximum amount of water maintained at all times. Under this latter condition, circulating-load variation is narrowed to that between 1,800 and 2,500 tons. The ease and quickness with which rake speeds may be varied from a minimum of 8 to a maximum of 20 strokes per minute facilitate the handling of greater tonnages by exercising a greater control of settling rates and raking capacity.

A classifier's function is to remove properly ground material and to return oversize to the fine-grinding system. If a ball mill is to run at maximum capacity, it must be fed at a constant rate with only material which requires further reduction in size. Inasmuch as ball-mill grinding is one of the highest-cost milling operations, it is necessary to take full advantage of all capacity; all the work done must be considered from an economical standpoint. Many factors are here

G.-E. 30-hp. adjustable speed a.c. gear-motor flat-belted to line shaft driving group of six rake classifiers. Speed is varied through pilot motor brush shift



concerned, such as power rates, repairs, fineness of grind required, cost of grinding media, cleaning mineral surfaces, and others. Basically all these may be considered as related to mill loading. Every mill has some optimum loading for a given condition of ore. If these conditions are not carefully considered—i.e., suppose sizing only were regarded—it is possible that circulating loads might be carried to the point where the cost of circulation exceeded the gain by increased recovery. As one or more of these factors may involve economic losses, the importance of the highest efficiency in classification is seen. The increased rapidity by which an operator can make these rake speed changes has been a great step forward in classifier and ball-mill operation.

Sizing analyses of the classifier overflows indicated that 2 to 3 percent less of plus-100-mesh material is overflowed with the variable-speed rake operation as compared to the former practice with constant-speed rakes.

The motors used have proved ideally suited to this application. Operators can select any desired rake speed within a ratio of 3 to 1 by merely turning the hand wheel. A ratio of 2.5 to 1 adequately covers the operating range, but by turning the hand wheel to minimum speed position at start, a very high torque becomes available. For example, the 7½-hp. gear-motors develop a crawling torque exceeding 250 percent of the full-load running torque. This torque is usually sufficient to start the rakes with belts tight, thereby saving belt wear. Only when the classifier has been idle many hours is it necessary to raise the idler sheave of the Lenix drive to bring the motor up to speed before lowering the idler to pick up the load. This exceptionally high torque is obtained without drawing more than 140 percent of high-speed full-load current, making it possible to operate from long feeders without excessive voltage drop during starting.

As each drive is one sturdy unit, connected to the 440-v. supply by means of a simple three-pole magnetic switch, it is practicable to keep complete spare units on hand. In case of electrical failure, any motor or switch can be replaced within a few minutes.

The electrical investment is higher for individual drive than for group drive, but the increased flexibility and better mechanical arrangement warrant the additional expense. Although several alternative electrical drives offered some saving in first cost, and alternative mechanical drives offered a still greater saving, the dependable operation, convenience, and low maintenance expense of single-unit, adjustable-speed a.c. motors have justified their selection.

# Rotating Pipe Makes Good Calcine Conveyor

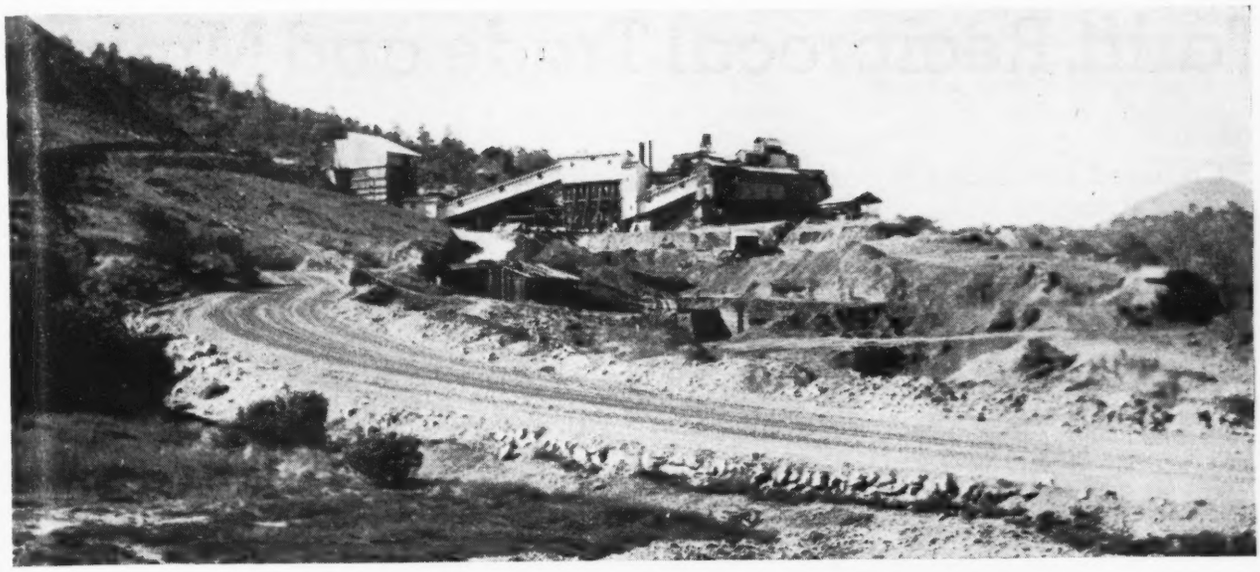
## *Simple installation solves burned rock disposal problem at mercury mine*

**Worthen Bradley**
*President*
*Bradley Mining Company*
*San Francisco, Calif.*

At the Sulphur Bank quicksilver mine, in Lake County, Calif., a noval calcine conveyor was constructed and placed in operation during 1941. The burned rock from the discharge end of the rotary kiln had for years been dropped into a V-trough and sluiced 125 ft. down the hill below the plant. The trough was laid at an average angle of 10 deg., and received considerable wear, the ⅜-in. angle-iron liners needing replacement every six months. Among other cumulative disadvantages of the old system, the calcine which piled up at the foot of the trough had to be removed periodically to larger piles farther down the hill by means of a double-drum dragline hoist and scraper installation. This dragging operation necessitated continual expense for plant operators' time and for materials (mainly wire-rope replacements). The calcine was badly needed on the 6 miles of camp and pit roads, but to get it there meant borrowing some pit equipment—a power shovel or tractor—for loading the material into trucks. Withdrawal of this equipment would often occur at critical periods.

Before construction of the improved layout could begin, a deep shovel cut had to be made as close as possible to the kiln foundation piers. Concrete retaining walls were poured at the sides of the cut and at the back end toward the kiln, and a foundation pier was poured midway between the two sides. From side wall to side wall across the middle pier steel I-beams were set at a height of 9 ft. from the ground. On these beams was erected a welded-steel tank made from ¼-in. plate and measuring 20 ft. in diameter and 15 ft. high. The calcine, minus 2 in. in size and at a temperature of over 600 deg. C., drops from the lower end of the kiln into a small conical hopper. It builds up in the hopper until it reaches the level of a 10-in. round outlet, subsequently spilling through this opening through a sealed connection into a rotary tube 36 ft. long. The tube is merely an unlined section of standard 16-in. pipe, mounted and geared for rotation. Power is furnished by a 3-hp. variable-speed motor through a gear set, and the pipe usually revolves at 8 r.p.m. The calcine discharges from its lower end through a sealed opening into the tank mentioned above.

The tank has a capacity of 100 tons of calcine, representing 40 hr. of kiln throughput. This is just enough to allow the tank to go from Saturday evening to Monday morning without unloading. The center beam of the three beams supporting the tank divides the tank bottom into halves, and in each half are two openings 18 in. square spaced equidistantly from the center. The hoppers below these openings are closed by arc gates, with arm-and-lever extensions permitting the operator to stand well away during the opening and closing operation. Dump trucks back in (there being room for one on each side of the center pier) and receive their loads of burned rock. The trucks dump the calcine in windrows somewhere along the road, and the piles are allowed to undergo a cooling-off period of from two to four days, depending upon the temperature of the air. It should be explained at this point that the Sulphur Bank kiln is both fired and fed at the upper end, contrary to standard practice, and that its gases leave at 1,200 deg. F., or about twice the usual temperature of standard practice. Then the motor grader comes along and spreads the calcine on the road, thus completing the "back-to-the-land movement" of the rock. The material makes excellent road surfacing—much better than the beach gravel formerly used. The calcine road surface is gone over several times a day with the sprinkling truck, and this wetting, plus the continual impact of truck traffic, cements the material and

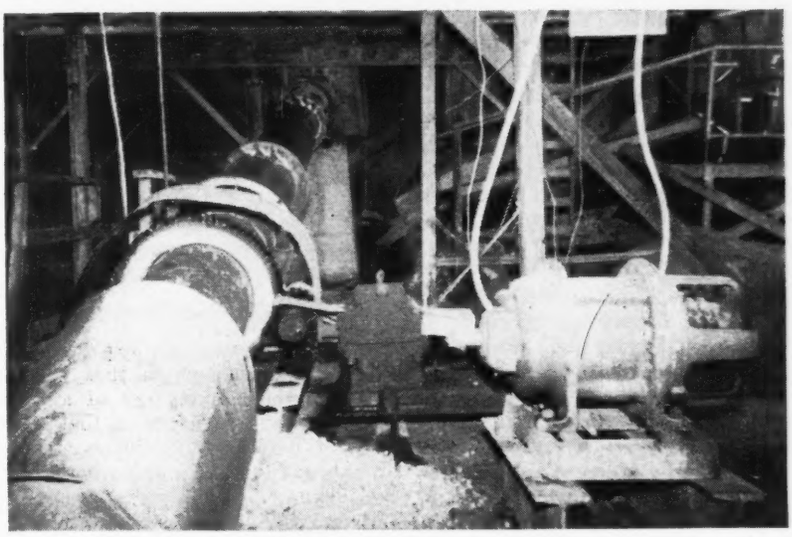


**Sulphur Bank quicksilver mine, Lake County, Calif., where the conveyor is in use**

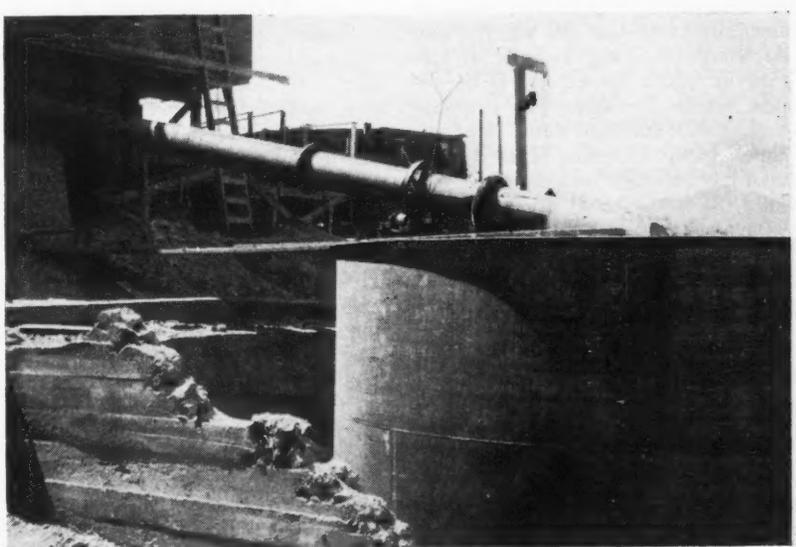
prevents appreciable dusting. In fact, the roadbed becomes so hard that it often has to be blasted when a cut has to be made in the course of mining.

Under the old calcine-disposal system a cold updraft entered the kiln dust chamber. Under the present system this is not only avoided, but advantage is taken of the heat radiation from the calcine tank, back up through the rotary tube into the dust chamber. The beneficial results are similar to those derived from the "soaking-pit" arrangements of some other plants, where the calcine storage is directly under the end of the kiln. The method assures heat economy, permitting less fuel to be burned, or allowing more throughput of ore with the same amount of fuel, and there is the additional advantage that any quicksilver fumes remaining in the calcine are given additional time to rise into the condensing system. Sulphur Bank kiln throughput has gradually increased from an average of 49 dry tons per 24 hr. in 1940 to the current daily average of 60 dry tons. This period includes the time during which the new calcine disposal layout was developed and placed in operation, and this was probably the main factor in stepping up tonnage. Other contributing factors have been a slight reduction in ore moisture (15 percent $H_2O$ in 1940 to 12 percent thus far in 1942), more efficient preheating of fuel oil and installation of a reflector on the end of the burner, and a slight increase in the kiln's speed of rotation.

Men responsible for the development of the calcine disposal unit described in the foregoing include A. F. Wolbert, superintendent; R. G. Hall, metallurgist; and J. M. Forrest, engineer.



**Drive mechanism at upper end of conveyor**



**Discharge end of 16-in. pipe conveyor at storage tank**

# Tariff, Reciprocal Trade and Mining

*Changed conditions warrant revision of our policy, vital to domestic mining*

**Evan Just**
*Assistant Editor*

OUR TARIFF POLICY, which in recent years has been virtually synonymous with Secretary Hull's reciprocal trade program, is due for Congressional review, inasmuch as the Reciprocal Trade Act expires June 12. Between now and that time Congress must renew or renounce the Act, the three-year term of which has been twice renewed already. Thus the program has had nine years of existence.

It would be difficult to predict the fate of the program in Congress if it were not inextricably tied up with our current foreign relations policy. However, in view of the certainty that our Allies would naturally interpret Congressional refusal to renew the Act as evidence of a trend toward another run-out on our part in international affairs, it is scarcely expectable that Congress will fail to renew the basic features of the program.

### A Perpetual Battle

In a nutshell, the conflict over our tariff policy, already a century old, is epitomized in the statement that everyone is more or less amenable to arguments favoring freedom of trade so long as he is contemplating the problem objectively. However, when the discussion drifts over to the protection afforded the industry in which he gains his living, arguments lose weight rapidly and self-interest prevails.

As a protected individual, the miner is likely to be a particularly ardent protectionist, because the mineral deposit which he works to gain his living or in which his capital is represented cannot be moved in response to a shift of trade conditions. Because of inescapable depletion, this deposit constantly becomes poorer, thus justifying, in his eyes at least, further increments of protection. Also, many mining communities are isolated, and would have no basis for continued existence if their backbone industry should be blighted. The issue of tariff protection in such cases arouses whole communities, or even states, to active participation on the protectionist side.

### Infant Industry Protection

When this country was undeveloped and was undercapitalized in comparison with strong foreign nations, one of the principal bastions of protectionism was the argument favoring encouragement for new, weak industries, which might otherwise not be able to withstand aggressive competition from well-established foreign industries.

On the protectionist side, it can scarcely be refuted that tariff protection did and does actually nurse infant industries into being, even today when we are well capitalized. Probably most low-tariff advocates would be content to permit this sort of protection if experience indicated that after establishment the beneficiaries would be willing to permit the protection to be relaxed, which is hardly ever the case. In view of this inflexibility, the opponents of protection suggest that as well capitalized a country as our own ought to be able to finance its industries adequately to carry them through the early stages, if they have economic justification for existence.

### High Living Standards

The most commonly expressed protectionist argument is that tariff is vital to the maintenance of a standard of living higher than that of the rest of the world. To thump the "full dinner pail" and depict the high-living American workman as at the mercy of "peon," "coolie," or "slave" competition were the mainstays of an ascendant protectionism for more than a generation.

Within the protected industries this argument carries compelling weight. It is folly to argue that our domestic zinc and lead mines, for example, would not be seriously affected by reduction of their tariff protection, except during an extraordinary upsurge of their market, as at present. Thus, it is unrealistic to assume that they will ever contemplate the loss of this protection with equanimity, or fail to demand more if their costs go up, as the result of depletion or higher wages. Their dependency is bound to be emphasized by the wage levels imposed on them in the war emergency, it being scarcely expectable that labor organizations will fail to resist a falling scale of wages when market demands shrink to peacetime levels.

To these contentions the opponent argues that all producers are also consumers, that there are more consumers than producers, and it is the domestic consumer who is forced to pay the extra cost of keeping the protected producer in business. The fact that any single element of protection can be vital to a producer group but is only a small charge when distributed among a multitude of consumers is balanced by the fact that the total charge to consumers is equal to the benefits obtained by producers and may also include costs due to inefficiency of the producers, when not spurred on by genuine competition.

The low-tariff advocate wants to know, if the "standard of living" argument is valid, why we have such unequal standards within the free-trade area of the United States, both from place to place, and from individual to individual; also, why low-tariff countries, much poorer per capita in natural resources than ourselves, such as the Scandinavian countries and Switzerland, can enjoy living conditions that for reasonable purposes are as good as our own, in addition to a total lack of a destitute group, despite "coolie competition." He insists that living standards are due to the industriousness, thriftiness, efficiency, and ingenuity of people, and their access to natural resources, rather than to tariff protection. In his opinion, a basic reason why the United States is a prosperous nation is because it embraces the largest free-trade area in the world. To him, our high-wage economy is a fool's paradise, the higher incomes being completely offset by the higher cost of living.

### National Self-Sufficiency

The high-tariff proponent affirms that protection is justified in order to maintain national self-sufficiency in those cases where protection is necessary to produce, and can produce, that result.

The major non-ferrous metals, copper, zinc, and lead, furnish a case in point. In comparison to ordinary price levels, each of these metals enjoys a substantial margin of tariff protection, by which the industry was able to maintain a status considered in pre-war days to be adequate to meet a national emergency. Moreover, it can scarcely be disputed that such a status could not have been maintained without the tariff protection afforded to these industries. At this time prob-

ably nobody would deny that protection for these industries "paid out" its full cost by enabling us to meet our herculean task as the "arsenal of democracy."

Nevertheless, the very magnitude and diversity of our present supply problem gives the anti-protectionist a foothold if the case is argued in terms of the present and future instead of the past. He can point out the impossibility of anticipating emergency needs, as illustrated by the circumstances that we find ourselves short of some minerals we thought we had in ample abundance, such as copper and zinc, while we are fairly well situated in regard to some minerals we classed as strategic, such as manganese, tungsten, chromium, and mercury. Also, new technique in wartime creates a demand for new materials not anticipated by anyone, such as quartz crystals, and indium.

This is not a complete answer. Our dilemma would have been immeasurably worse had we failed to achieve the self-sufficiency we did attain, partly because of tariff protection. However, considering the diversity of modern industry's material needs, the rapidity with which war is depleting our mineral reserves, the fantastic magnitude of wartime demands, and technical changes, it seems true that no nation on earth can expect to be self-sufficient in terms of the material needs of any future world war.

## Conservation of Scarce Resources

The conservation argument is often thrown into tariff controversies on the basis that we should not encourage industries which exhaust scarce natural resources, such as the strategic minerals, but should rather conserve these scarce resources for the needs of an emergency. The protectionist replies that no natural resources will be of any use in an emergency if industrial facilities are lacking to make them quickly available or if the techniques of their extraction and prefabrication processing are allowed to lapse.

This would seem to leave the conservation matter deadlocked. Probably a reasonable attitude is that the latter argument outweighs the former, particularly when it is realized that modern science seems able to devise adequate substitutes for any material, given a reasonable time to solve the problem.

## Balancing of Trade

A low-tariff argument to which the experience of recent years lends weight is that it is silly to plan on a perpetually "favorable" balance of trade. The result of such a situation is that we have possession of the bulk of the world's gold, so abundant here that we have to "sterilize" a part of it, and so scarce in other countries that the economy of the world is dislocated. Having no gold, they are unable to operate on a gold standard; thus the gold standard is in danger of being undermined, with us "holding the sack." If through this "favorable" situation, other countries are compelled to discountenance gold as money, or if we find it necessary to hand out loans of doubtful collectibility in order to restore health to a sick world from which we do not seem able to separate ourselves, then the net result is that we have given away the goods which the gold purchased.

Probably as the richest nation on earth today, we would possess a large share of the world's gold in any event; however, there can be no doubt that our protectionist tariff policy is responsible for the excesses existing in this situation.

## Economic Causes of War and World Depression

Low-tariff advocates unquestionably have a valid argument in their contention that tariff and other impediments to trade reduce the free flow of raw materials over the earth and thus contribute to the economic insecurity of "have-not" nations, which in turn drives such nations to dictatorship and war as a means of obtaining what they cannot gain by economic means. Also, by impeding trade, and by encouraging the utilization of lower quality resources than those available elsewhere, tariffs make the whole world poorer.

The answer that war has other causes than economic ones is certainly true; nevertheless it is inadequate. There is a reasonable basis for differences of opinion as to the weight to be given protectionism as a source of war, but that it does contribute to some extent is indisputable.

## The Reciprocal Trade Program

Admittedly the tariff policy, if it can be so called, which is the product of a hundred years of controversy in Congress, is a hodge-podge, through which no consistency or guiding intelligence can be traced. It is simply the product of Congressional yielding to pressure, the form reflecting the pressures applied. Members of Congress will readily admit this; also that Congress has developed no way of avoiding the minority rule and log-rolling tactics that develop whenever a tariff bill is the subject under consideration.

Thus, except when under sectional pressure, most of the members of Congress are not averse to delegating the tariff-making function to an agency which can operate under a policy based on reason rather than political pressure. Even in the protectionist high-tide days when the Smoot-Hawley Act was enacted, provision was made to permit the President to flex tariffs 50 percent up or down, basing his action on findings of fact by the Tariff Commission. However, the flexible mechanism didn't flex, probably for lack of sufficient advocacy of change to warrant facing the inevitable opposition.

The Reciprocal Trade program is presented by its adherents as a scientific tariff-making mechanism. There is set up a Trade Agreements Committee, on which the departments of State, Commerce, Agriculture, and Treasury, and the Tariff Commission are represented, and to which all other committees, several in number, are subordinate. The law contemplates that, after due findings of fact by the Trade Agreements and associated committees, the State Department shall undertake negotiations with individual foreign countries to conclude treaties involving mutual tariff concessions and the removal of other barriers to trade. A division of the Department of State is set up to handle these matters.

One of the chief selling points of the program is the complex array of committees set up tributary to the Trade Agreements Committee. There are various country committees, various commodity committees, a Planning Committee, and a Committee for Reciprocity Information, the function of which is to hold public hearings on trade agreement matters. The country and commodity committees are described as including expert advisors from all pertinent branches of the federal government. When a given country has consented to attempt negotiation of a trade agreement, and after the committees have made tentative findings of fact as to appropriate commodities on which to negotiate, public notice is given of intention to conclude a treaty; then briefs are received and hearings are held by the Committee for Reciprocity Information. When the public has been heard, the Trade Agreements Committee and its tributaries make definite findings as to the commodities to be treated and the range of alterations permissible. These findings are handed to State Department negotiators, who perform the actual bargaining with representatives of the foreign country concerned.

The latitude permitted in making these agreements is restricted to 50 percent up or down from the levels given in the Tariff Act of 1930 (Smoot-Hawley Act). Most agreements run for three years and as long thereafter as either signatory country is willing to let them stand. All of them contain escape clauses, giving opportunity for cancellation in case

of prejudicial exchange fluctuations, or for removal of single concessions in case imports resulting are damaging to established domestic industries. The recent Mexican agreement also contains an escape clause referring to the effectuation of government controls over business. Advocates emphasize that, because reciprocal concessions are obtained for those given, we obtain something of value in return for yielding concessions which are in our own interest anyway.

### Most-Favored-Nation Policy

Under most-favored-nation clauses contained in compacts we have with many nations we are obliged to extend to them any concession granted to any country in a trade agreement. However, except for countries which we blacklist for indulging in discriminatory trade practices, it is the policy of the United States to grant concessions made in trade agreements to all other countries, whether we have most-favored-nation understandings with them or not. Because this unconditional most-favored-nation policy admits us to the concessions other countries grant to each other, trade treaty advocates insist that it is a source of profit to us. For complete protection in this respect, it is the announced policy of the trade agreements organization to make concessions on a given commodity only with the country which is the principal source of imports of that commodity.

As proof of the expert, scientific procedure followed in the fixing of tariffs under the trade agreements program, adherents point out that objections are relatively few, although hundreds of concessions have been made.

### Objections to the Program

Most objectors to the reciprocal trade program are discontented primarily with the manner in which the program has been administered, rather than with its basic mechanism or expressed intent, if the record of their statements discloses their real feelings.

From experience, it seems fair to say that the administration of the program does not fully bear out the contentions of its adherents as to its scientific impartiality and expert conduct. The truth seems to be that the mechanism has been staffed with low-tariff zealots and parties holding academic viewpoints in key positions, to the extent that the meticulous deliberations described are sometimes passed over in haste to accomplish low-tariff objectives without inconvenient delay. The lack of an objective attitude exhibited by the Committee for Reciprocity Information, and the general results from protests against reductions, have convinced most opponents that decisions are in fact made before the public is heard and that protests are futile. In the case of the zinc reduction in the Canadian agreement, the prepared reply of the State Department to the outcry which developed in the industry after announcement of the concluded treaty indicated that no informed findings of fact on zinc were available and that a convenient set of arguments was hastily thrown together to meet the situation.

This criticism is made fully recognizing that, had a more expert, objective administration been created, the total result would have been little different, as nobody assumes that the reciprocal trade program was set up to make tariff rates higher or that a process of bargaining with foreign countries could achieve that end. Nevertheless, the people whose vital interests are adversely affected would feel much better about the program if they were convinced that the changes were made on honest fact-finding, rather than on the exercise of prejudices opposite to their own.

### Double-Talk on Escape Clauses

Parties who are agitated over the prospect of losses due to increased foreign competition in the domestic market through the concessions are commonly soothed by statements that it is not the intention of the program to cause damage to established domestic industries. The escape clauses in the treaties covering this aspect of policy are pointed out, and the appellant is certainly led to believe, if not actually promised, that damage to established domestic industries resulting from the concessions will be prevented.

However, as illustrated by the experience of the zinc industry, when damage occurs or is impending, representatives of the affected industry are met by a confusing mixture of reiterations of this policy and evasions of the facts presented. The victim of these proceedings gets the firm impression that there is no real intention of withdrawing concessions unless the damage amounts to a catastrophe. He feels, with anger, that he is simply being led on by being subjected to the art, dear to a certain element in diplomatic circles, of making "no" sound like "yes." The domestic zinc industry was indisputably damaged by the inroads of its market, due to the Canadian concession, from Belgium, Mexico, and Canada, and by the price reductions set up by the decrease of protection, but in a year of patient efforts to persuade the trade agreements organization to live up to its announced policies, the industry got nowhere.

Opponents of the program, in answer to the claims that complaints from domestic industries have been relatively few, insist that this is not because of the highly scientific treatment claimed, but is simply due to the circumstance that, by and large, reductions have been confined to the removal of excessive, unutilized segments of protection. This seems like a reasonable conclusion. Human nature being what it is, adversely affected parties are bound to protest, no matter how scientific the process used in their vivisection may be.

Adherents argue that the effect of the program is so beneficial in creating general prosperity that all markets are expanded, thus providing room for additional foreign participation in the domestic market without damage to domestic interests. This argument, whatever its merit, is impossible to prove or disprove. Prosperity and depression are due to such a complexity of factors that the influence of the reciprocal trade program cannot be directly traced.

It would seem that the whole premise of no damage to established domestic industries ought to be abandoned in favor of a policy of making reductions gradual and orderly, giving the affected industries ample time to adjust themselves with a minimum of dislocation. The thesis that we can make concessions, valuable enough to another country to warrant valuable concessions by it, without damage to protected domestic industries is patently absurd, unless one gives more weight to the general prosperity factor than impartial analysts are willing to grant.

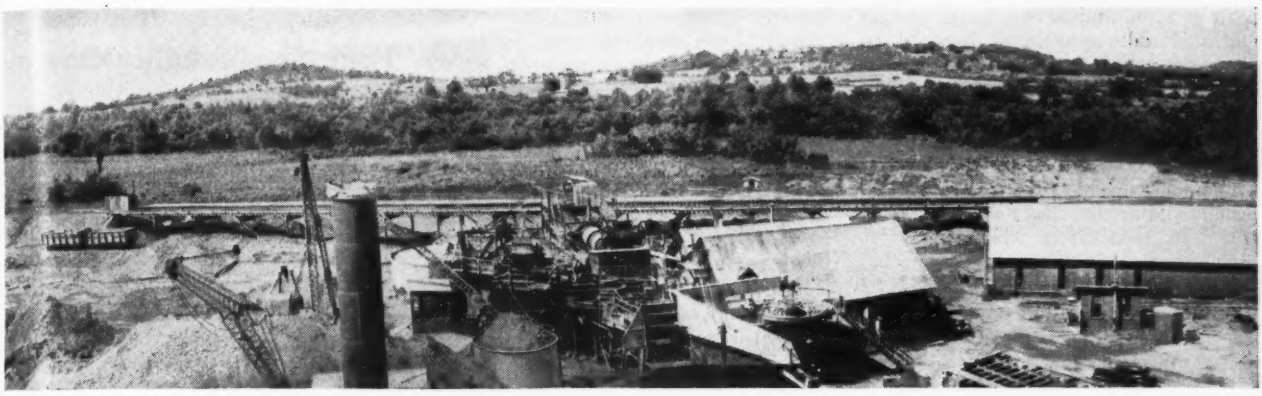
### Third-Nation Benefit Objections

In discussing their policy of making concessions on a given commodity only to countries which are the principal source of imports, program adherents inferentially admit that to violate this principle would result in excessive, uncompensated benefits to outside countries. Thus, in the light of their own viewpoint, such violations constitute a serious error. Yet, within the mining field alone, the concessions on manganese to Brazil, on zinc, ferromanganese and cobalt oxide to Canada, and also on zinc oxide to Mexico, are clear transgressions of the principle. Such actions only serve to confirm the impression that the program is dominated by zealots who use the imposing "scientific" mechanism merely as a front.

Turning to the contention that we gain more than we give through the unconditional most-favored-nation policy, this is also a point impossible to prove or disprove, quantitatively.

Surficially, at least, it would appear that we cannot expect to profit directly by this principle so long as we are trading access to the world's

(*Continued on page* 128)



**The Hoover & Mason phosphate washer as viewed from the upper part of the drying plant. The 425-ft. double-track steel storage trestle is seen at the far side**

# Tennessee Phosphate Field Sees Changes

## *II—The Hoover & Mason company improves its washer in Mt. Pleasant district*

WATER SUPPLY is an important matter in the phosphate area of central Tennessee. The Hoover & Mason Phosphate Co., in the Mt. Pleasant district, normally uses 2,500 g.p.m. Its average capacity, on a washed dry basis, is 30 tons of finished product per hour. This is not the whole picture, however, because the muck brought to the plant varies in character. Recovery may be 50 percent or as low as 25 percent. At times the company could use as much as 4,000 g.p.m., but it does not have so much. The plant is getting all the water that comes down the watershed and recovers all water possible by use of settling and storage ponds for winter rains.

The Hoover & Mason company has long had certain equipment of its own design not to be found in other plants.[4] Some of this has been changed or done away with recently: the skip hoist that formerly took the feed up into the plant has been eliminated; a steep flight conveyor replaces it; the mulcher has been taken out and replaced by a set of double logs of Hoover & Mason design and manufacture.

Hoover & Mason, though interested in trucks, as to be discussed subsequently, still hauls in trains of dump cars drawn by dinky steam locomotives, as was the case two years ago.[4] Since then, it has provided unusual and elaborate new facilities for dumping and storing the matrix ahead of the plant. The railroad track, of 36-in. gage, has been elevated on a double-track steel trestle over a storage pit 425 ft. long and wide enough to receive the matrix dumped from the two tracks, which are separated 28 ft. center to center. Forty-eight cars can be dumped at once. The pit is bottomed on limestone bedrock 7 ft. below ground level. The trestle may be entered from either end, the approach on the west end being 1,700 ft. long at 1 percent grade, and that at the east end 800 ft. long at a 1½-percent grade. The trestle is substantially built of steel (able to carry 48 cars and 4 locomotives) with walkways on each side. It is 24 ft. high (to crown of rail) above the pit bottom. In the west end beneath it 3,200 tons can be stored and in the east end 2,800 tons. An accompanying photograph shows this trestle.

Beneath the trestle at the midpoint of its length and mounted on rails 14 ft. above the pit bottom is a traveling bridge, having a run of 38 ft. On it is mounted a double-drum Sauermann hoist and 50-hp. motor which operate a Holcomb hoe-type scraper. With this the stored phosphate matrix is brought to the conveyor that feeds the plant. The maximum length of drag is half the length of the trestle, or 210 ft. Speed of scraper loaded is 300 ft./min. and unloaded (on the back haul) 400 ft./min. With it 100 tons per hour is readily handled and even more could be scraped. Above the hoist mounted on the bridge is an hydraulic gun with a ¾-in. nozzle. This will supply a small volume of water at a pressure as high as 100 lb. per square inch.

Matrix handled by the scraper is delivered to a grizzly or grating, 8x10 ft. in dimensions and having 16-in. square openings, which rests in the pit bottom and over the boot of the flight conveyor that elevates the matrix to the rolls and log washers. Water from the gun is used to clean the hopper beneath the grizzly if necessary.

In dry weather it may be essential to condition the matrix stored beneath the trestle, as it may have become dried and caked. Water is used for this purpose, being brought in a 2-in. line under the trestle and above the muck pile. It is bled from the tailings discharge and its pressure can be built up to 40 lb. per square inch with a pump handling a maximum of 300 g.p.m. (but intermittently).

The flights of the feed conveyor are each 10x36 in. and made out of a bulb ship angle weighing 35.4 lb. per foot. The operating position is at 90 deg. to the chain. The boot pulley and head pulley each have no sprockets, in this imitating practice at the Monsanto plant in this district. To give good traction the surface of the pulley is built up in hard-faced ridges about 2 or 3 in. apart circumferentially. These project slightly, so that the flights engage them as they pass around the pulley.

Inclination of the conveyor is 30 deg. (only 15 deg. at Monsanto) and the speed is 60 f.p.m. Its bottom, to prevent being scoured by the returning inverted flights, is lined with rails parallel with the conveyor. There are about eight of these.

The conveyor discharges the muck directly into a 36x36-in. set of crushing rolls (there were two sets formerly—in the old flowsheet described in 1941). Reduction is to minus 4 in. as before. The crushed product falls directly into the lower end of the double homemade logs previously mentioned. These logs are 30 ft. long and

[4] See *E. & M. J.*, March, 1941, "Phosphate —The Vital Non-Metallic." Part VI.

42 in. c. to c., and have a 14-in. paddle length. Paddle spacing is about 10 in. They are now using Ni-Hard paddles entirely. The set of logs, instead of being driven from the upper end, is driven from the lower end, where the greatest torque and strain develop.

The logs discharge into the rotary dasher shown in the flowsheet published[4] in 1941, from which point on the flowsheet is the same as before.

The original pan conveyor, 24x12 in. in dimensions of the pans, has been redesigned with plates 24x60 in. in size, having holes about ⅞ in. in diameter spaced 1 in. c. to c.

A new feature of the plant is the control room of the washer. From it all parts of the washer can be seen. In this room, which is approximately 10x10 ft. in dimensions, are the switch boxes and control equipment of the various motors.

Periodic check-up of motors with a megger set has been a feature of plant operation for the past year. The company has its own core and armature winding shop and a baking oven. It uses only 440 v., 3-phase motors.

The 2-tube bagger formerly used is being replaced with a 4-tube bagger, supplied by the St. Regis Paper Co.

In the mining department, the excavators, the cars (4-cu.yd. Western side-dump) and the locomotives (18 tons) are the same as reported[4] in 1941. Mining proceeds on two 8-hour shifts per day; washing on three 8-hour shifts per day. The grinding department operates continuously.

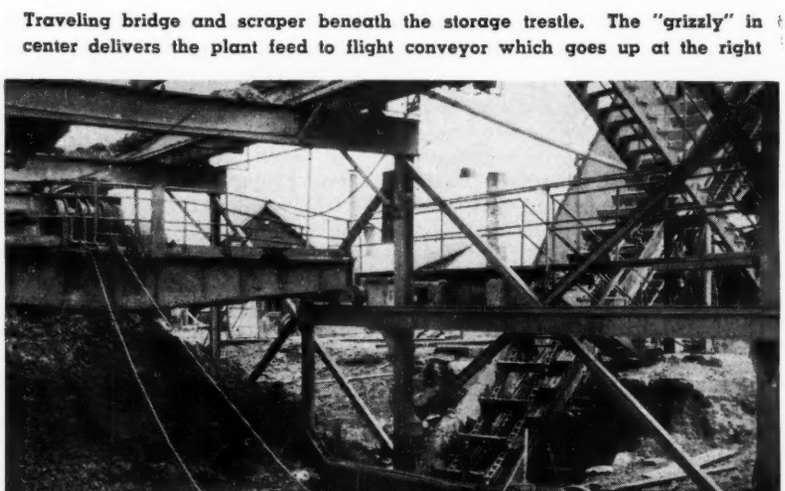
Products made today range from 65 to 72 percent B.P.L. Years ago, in contrast, there was little market for anything under 75 B.P.L.

Hoover & Mason, the largest owners of lands in fee (these have been up Quality Creek, adjacent to the present plant), have acquired new lands on Rutherford Creek in fee, 16 or 17 miles from the Mt. Pleasant plant. No plans respecting them have been made.

In Mr. Morrison's opinion, the life of the Columbia-Mt. Pleasant field has been lengthened by the possibilities of truck haulage. The newer excavators also are more flexible. It is now possible to work small, scattered, isolated deposits formerly exploited only by contractors. These are pockets. It is also possible now to haul 10 or 12 miles to mine a single acre of rock and then pull out and go elsewhere. This was not possible before, because such a deposit was not sufficiently large to justify running a tram line. Many of these small pockets are high-grade, but there are not enough of them to have warranted one in going after them before this. The deposits around which the existing plants were built have been large. One could not justify building a plant unless there was 1,000,000 tons or more on which to amortize the investment. Now the scattered deposits may yield as low as 1,000 tons.

R. S. Morrison, superintendent, Hoover & Mason Phosphate Co.

Traveling bridge and scraper beneath the storage trestle. The "grizzly" in center delivers the plant feed to flight conveyor which goes up at the right



## "Big" Mine Produces Four Non-Metallic Minerals

THE BIG MINE, in Cheshire County, New Hampshire, a combination of properties formerly known as the Davis and Rhoda mines, was originally opened for mica in 1810. Since then it has become one of the largest producers of sheet mica and feldspar in the State. Some years ago it was purchased by Golding-Keene Co., Keene, N. H., and operated chiefly for feldspar. Flooded in recent years, it was pumped out last fall and is again being operated for sheet mica and feldspar, with quartz and beryl as by-products. Recently it has been studied by the U. S. Geological Survey.

The deposits lie in a pegmatite of irregular outline, which trends northeast and dips southeast. It is much wider toward the northeast end than toward the other and appears to plunge northeast. The wall rock is biotite-muscovite schist, gneissic near the contacts, where it is characterized by small red garnets and black tourmaline crystals. Near the east contact the schist is chloritic. Strike and dip of the foliation vary widely in the quarry area, but most commonly the strike is a few degrees east of north and the dip steeply southeastward. The pegmatite rarely parallels the strike of the foliation but roughly follows the dip in places. Toward the northeast end, it turns sharply from an east dip to a westward one, the footwall becoming the hanging wall.

The pegmatite is zoned distinctly from wall to wall. Next to each wall is a 3- to 5-ft. band of sheet-mica books associated with albite-oligoclase and quartz; next comes a 10- to 20-ft. zone rich in long blades of biotite, with much plagioclase and quartz; and then the central zone, of quartz and graphic granite, which contain large concentrations of high-grade white microcline-perthite. Beryl occurs as small crystals in the biotite-rich zone near quartz veins and in somewhat larger crystals in the central zone, associated with irregular masses of quartz and jumbled masses of greenish "bull" mica. The sheet mica is rum-colored to ruby-colored, hard, clean, and generally of good quality, although in places it is ruled and shows "A" structure.

Development consists of stopes, shafts, and drifts along the west wall north of the pit, which occupies the center of the pegmatite and extends along the east wall to the south. The part of the west wall contact zone south of the open pit is operated by New Hampshire Mica & Mining Co., whereas the pegmatite north of the pit is operated by Golding-Keene. Underground, room-and-pillar mining is used.

## Reflections From Washington

(*Continued from page* 57)

on a descending scale. For third-quarter delivery, the operator will be permitted to place orders during the second quarter for 80 percent of the amount specified in the operator's second-quarter quota, for 60 percent for delivery in the next following quarter, 40 percent in the next following quarter, and 20 percent in the next following quarter. This same relationship will prevail as quarters advance. Thus, the operator will always be able to place orders for a fraction of his future needs, ranging from 80 percent of the then current quarterly quota for the following quarter, to 20 percent for the fourth following quarter. In each case, however, an order must have an allotment number corresponding to the month in which delivery is promised, and the supplier must refuse the order if he cannot promise delivery in the month designated.

### Foreign Mines Covered

EXCEPT for foreign mines operating under Preference Rating Order P-58, foreign mines engaged in war production under agreements sanctioned by the Board of Economic Warfare are also eligible for assistance under the revised P-56. Priority assistance to these mines is granted through the mine supply control districts set up in Latin American countries by the BEW. Canadian mines are treated like domestic mines under P-56 and issued dollar quotas, but their controlled materials allowances are allocated from Ottawa on PD-400 forms.

### P-73 Also Revised

EFFECTIVE MARCH 24, smelters and refiners of antimony, cobalt, copper, iridium, lead, mercury, molybdenum, nickel, platinum, tin, tungsten, vanadium and zinc are also fitted into the CMP mechanism under the same general procedure followed for the mines under P-56. Under P-73 as revised, they will apply to the Mining Equipment Division of WPB on form PD-760 for quarterly quotas, on maintenance, repair, and operating supplies, and will likewise be assigned allotment numbers for purchases of controlled materials. Smelters and refiners will have the same problem in applying allotment numbers only to deliveries for the month indicated by the last two digits of the number, and will have similar privileges in regard to placing orders for future delivery on percentages of their current quarterly quotas. For new equipment they must apply directly to the Mining Equipment Division, giving full particulars as to what is needed and what justification exists for the request. Under the new revisions there is no difference in the procedure for smelters and refiners based on the magnitude of their needs, as was the case when part of them were under the Production Requirements Plan.

### Silver Pot Boils

PRICE CEILINGS for a dozen specified lines of finished silverware were increased by OPA in March by 36c. for each troy ounce of silver contained in the article. This is in recognition of the fact that silversmiths must use domestic silver, which must be obtained at the 71c. quotation rather than imported metal at a lower price.

Meantime, Congressional efforts to abolish the silver purchase program by indirection suffered a setback. An amendment to the Treasury-Post Office appropriation bill, which would have ended the silver purchase program by the simple expedient of denying funds, was rejected in the Senate on the grounds that it was legislation in an appropriation bill.

### Premium Quota Plan Royalties Frozen

EFFECTIVE APRIL 1, OPA froze royalty rates on copper, lead, and zinc ore production at the levels which prevailed on Dec. 31, 1942. The purpose was to prevent landowners of leased mining property from participating in the B and C premiums instituted by Metals Reserve in January.

Considering the various types of royalty clauses extant, this order is likely to produce some interesting legal complications.

### Safety Shoes Obtainable

EFFECTIVE MARCH 30, OPA issued an amendment to its shoe-rationing order providing that employees who have used their personal shoe-rationing stamps, and without respect to the stamps possessed by other members of their families, can obtain safety shoes where warranted by the nature of their employment. The individual can make application to his local rationing board for such a need. However, the simplest procedure is for the employer to apply to the OPA district office, stating the total number of employees wearing safety shoes, any anticipated change in this number, the average wearing period of the shoes, an estimate of the number of pairs bought by employees during the preceding two months, and information about the nature of the work for which the shoes are needed. He should also designate some individual who can be empowered to issue certificates. On approval of the application, the district office will release enough certificates to take care of the plant's needs for two months.

### Milling, Smelting, Refining Removed from Price Order

MILLING, smelting, and refining charges for treating copper, lead, and zinc ores, concentrates, mattes, speiss, bullion, and blister have been freed from price control under General Maximum Price Regulation in an amendment (No. 15) to that order, effective March 24.

Previous amendments to the price regulation exempted from price control all copper, lead and zinc ores and their concentrates, lead bullion, and blister copper. Amendment No. 15 exempts also services needed to extract the metals from the ores. In addition, it permits enforcement of contracts for these services made before the amendment in accordance with their terms, even though sums collected after the amendment added to those collected before total more than the amount that could be collected legally under the General Maximum Price Regulation.

Action was taken, OPA said, on the basis that the main effect of controlling prices of the services was to fix proportions of increased servicing costs that should be borne by the servicing companies and by the mining companies, which are their customers. The proportions now may be determined by independent negotiations between the buyers and sellers.

### Chrome Price Exemption

EFFECTIVE MARCH 24, OPA exempted sales of domestic chrome ore made to dealers who buy for resale to Metals Reserve Co. This move was made to encourage deliveries in small lots, and to put the small producer who does not contact Metals Reserve directly on a par with producers who do. Sales to dealers who resell to private users remain subject to the price regulation, which is known as Maximum Price Regulation 258. Purchases by Metals Reserve are not subject to the price regulation.

### Gold Stabilization Proposal

RUMORS have been circulated in Washington in recent weeks to the effect that the government is "cooking up" a plan for stabilization of international currency relationships after the war in conjunction with the British. The latter were the first to bring the issue into the open with the publishing of a proposal by John Maynard Keynes, well-known British economist, calling for an international clearing bank and a new international

(*Continued on page* 133)

# Mine, Shop, and Plant

## When Starting the Compressor

IN STARTING a new reciprocating compressor or an old one that has been down for some time, the crankcase must be carefully cleaned of foreign matter and filled to the proper level with suitable oil. The cylinder lubricators also should be flushed and then filled with oil.

Warning! The Compressed Air Institute, of which all the important compressor manufacturers are members, warns that the compressor man must never use kerosene, gasoline, or other light petroleum products in flushing out cylinders or frames. They are volatile and dangerous to use! Better waste a little lube oil. Also, never use waste or rags which leave lint. It may clog oil passages.

When mechanical lubricators are filled, break the oil-line nearest the cylinder and crank the lubricators by hand until oil appears at the joints. This done, the cylinders will have oil at once upon starting.

Stuffing boxes should be packed carefully. Any packing used should be thoroughly coated with oil. If soft packing is used, it should be soaked in oil overnight to impregnate it. Packing should not be pulled too tightly at the start, for this may score the piston rods.

Before starting, make certain that the intake line has been blown out and cleaned of all dirt, welding shot, scale, and other matter. Many new machines have had valves and cylinder walls damaged by sucking in such foreign matter.

Cooling water should then be turned on to make sure there are no leaks in lines or jackets and no stoppage of flow. Jacket lines should be so connected that the flow may be noted either into an open funnel or by sight pressure glasses, if a closed system is used. Circulating water lines from cylinders and coolers should have drain valves at the lowest point to permit draining in cold weather in case of shutdown.

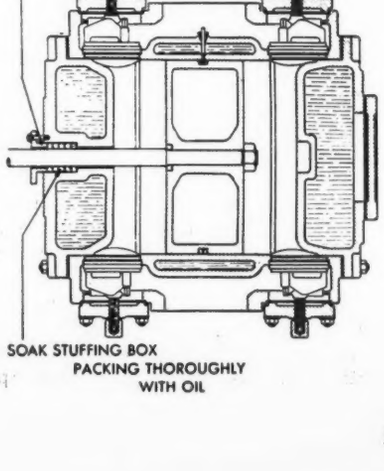
The compressor should next be turned over several times by hand. On starting, the power should be turned on gradually. During the first few hours start and stop the machine intermittently, feeling the bearings for temperature. Commonly a new machine is run in with the compressor valves removed so as to break it in gradually under no load. Make certain that all parts needing oil are getting it and that no part is heating up. After several hours' operation, the valves may be replaced, the jam screws which hold the valves on their seats being screwed down firmly. The machine may then be started and the pressure built up slowly over several hours.

If steam be used, the drains on steam cylinder and steam pipe above throttle must be opened before starting to eliminate condensation. Let a small amount of steam pass into the steam cylinders first to heat them gradually. Then the throttle may be opened enough to let the compressor turn over slowly. If it is of the single-crank type, bar it over beyond dead center before starting.

Establish an engine-room log requiring the recording of operating data at definite periods; the log should record what daily, weekly, and monthly inspections must be made. As an example, the valves should be removed and examined every six months (every two months if in 24-hour daily use). The log should require examination (with a flashlight) of cylinder walls, to insure that the cylinder is properly glazed and lubricated.

The valves should have an oily surface and be comparatively free from carbon. When reassembling, keep each valve assembly together and do not interchange parts. If head gaskets are replaced, water ports must be cut in the new ones, which must correspond in size and location to the ports in cylinders and heads. Failure to do this will cause overheating and possibly serious damage.

At predetermined periods, the compressor should be inspected for worn parts, need of new packings, and changing oil in crankcase. Inspection for complete overhaul should be made if the compressor has been used much. If the system provides for definite routine inspection for every purpose, the equipment will be kept in better condition, with less interruption to service and lower cost of compressed air.




Water jackets must be examined frequently and cleaned thoroughly. Their condition is evidence of the suitability of the cooling water used. Presence of heavy, hard scale forms an insulation which makes the jackets ineffective. Jackets can be cleaned by a pressure jet of water for silt or soft deposits, or by dilute acid if the scale is hard. The acid, 10 percent muriatic, may be forced through by a small circulating pump, or by running it from a container placed above the cylinders. Important: Neutralize the acid effect in the jackets with alkali after the acid treatment, to avoid doing damage.

With two-stage compressors, disturbance of the normal intercooler pressure is one of the first indications of trouble. If it rises, something may be wrong in the high-pressure cylinder, such as leaky or broken intake valves or a defective piston ring. If it falls below normal, trouble may be looked for in the low-pressure cylinder. Such a defect may also be indicated by the overheating of the discharge or suction valves. Unusually hot valve covers are evidence of leakage, which may be in the valve or due to a blown-out gasket between valve and cylinder. A metallic knock in the cylinder on each revolution indicates that something is loose. The jam screw may not be holding the valve firmly against the cylinder, or the piston may be loose on the rod. Such warnings should be promptly investigated.

## Fire Toll

GIVING POINT to recent reminders about fire hazard and the need for providing fire-fighting equipment and training men to use it, the following list of plants destroyed and other mining property damage is compiled from the last two issues of *E.&M.J.* All have cut or delayed production:

Federal Gordon mill, one of the largest in the Tri-State zinc and lead district.

Rialto No. 2 mill—another important Tri-State plant.

Spodumene mill of the Black Hills Tin Co., in South Dakota.

Drying room and warehouse, Magnet Cove Barium Corp., in Arkansas, a $19,000 loss.

Western Fluorspar Co.'s concentrator, in Colorado.

Shaft house and headframe, Fortune mine, also in Colorado.

Like much other equipment, fire extinguishers are hard to get. Practically the entire output of approved varieties is going to the Army and Navy and to manufacturers with top priority ratings. (Soda-acid extinguishers are out of production; likewise copper pump tanks, gas cartridge extinguishers of water and anti-freeze and all types having seamless drawn shells.) It is sensible therefore to take good care of the extinguishers in service. Recharging materials and replacement parts can still be bought. But the fire that is prevented from starting does not have to be extinguished.

## Old Parts Made New

"COLD CASTING" for building up worn parts, such as pump rods and shafts, with heavy coatings of electrodeposited metal, is cited by International Nickel in a pamphlet, just issued, which discusses the various means developed for reconditioning such parts. After considering machining and finishing, building-up by welding, and metal spraying, the writer passes to the field of electroplating referred to.

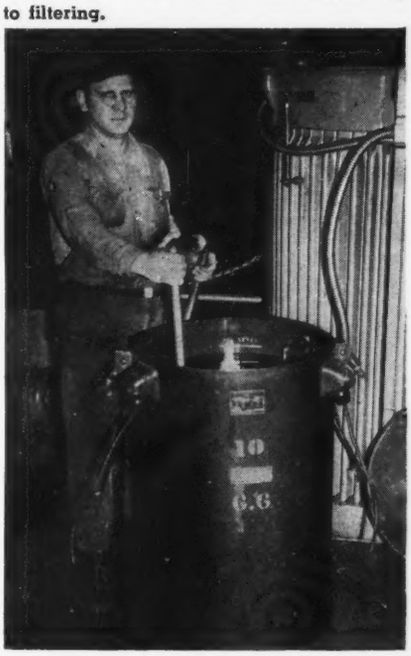
Although slower than welding or metallizing, cold casting has three advantages: it eliminates the possibility of heat distortion and warpage of work; where nickel is used, it produces a fine-grained, dense deposit that can withstand any corrosive condition under which solid rolled nickel can be employed; and third, it makes an extremely wear-resistant surface, for the hardness of the plating can be controlled to develop tempers ranging up to several times the hardness of the original pump rod or shaft.

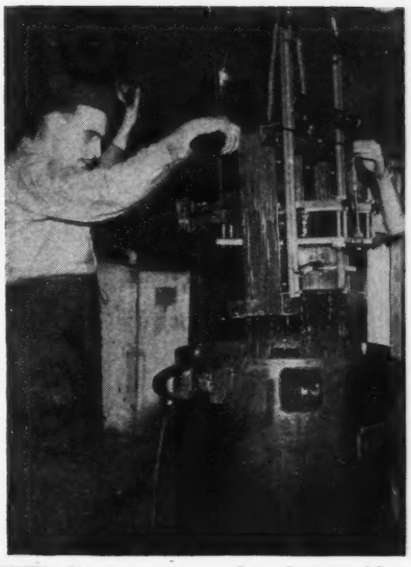
To prepare a part for cold casting, the worn section is machined and the surrounding area is coated with a lacquer or wax which prevent the metal from depositing where it is not wanted. The worn section is then cleaned, etched by acid and plated. The hardness is controlled by varying plating conditions. When the section is built up with the desired thickness of metal, it is finished to final size by grinding if "hard," or by machining if "soft" or of "intermediate hardness."

Cold casting, we understand, was developed in Great Britain, beginning about 1920, where it is known as "fescollizing" (from Fletcher Electro Salvage Co.). It has also been used in France. Use on this side has been developing rather slowly. The metal chromium has been used principally.

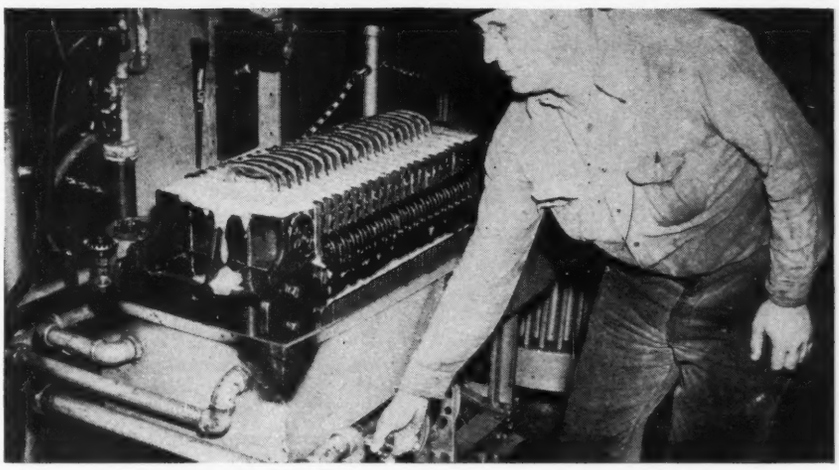
## Transformer Overhaul

**FIRST—Drain or pump off the oil. Usually this is put in a storage tank preparatory to filtering.**





**NEXT—Remove core and coil assembly for thorough inspection and cleaning. The inside of the tank is cleaned with transformer oil, removing sludge deposited at the bottom of the tank. The outside is cleaned and made ready for a repaint job.**



**THIRD—Run the oil through a filter press until it tests up to required dielectric strength. Core and coils are replaced in tank, and it is filled with the reconditioned oil. Insulation strength of core and coil assembly is tested by applying voltage from a winding to other windings and ground in accordance with manufacturer's instructions.**

FREQUENCY with which a transformer should be completely overhauled as a preventive maintenance measure depends upon its age and type and the conditions under which it is used. In normal operation, some transformers may and do function indefinitely without giving trouble. But heavy loads are being carried today, and frequent checks should be made to minimize the possibility of a transformer failing.

If trouble is developing in a transformer, the condition of the oil may reveal it. Samples of the oil should be taken and tested at least every three months from water-cooled transformers, and once every six months from self-cooled transformers of the larger sizes. If the oil tests below 20 kv., it should be dried by filtering.

Some of the steps in checking and reconditioning a transformer are shown in the accompanying pictures, through the courtesy of General Electric. Plants with facilities for doing this kind of a maintenance job are the exception rather than the rule. In most cases transformers are sent into the manufacturer's local service shop for the overhaul; in some, equipment to do the job is obtained through special arrangements with the manufacturer or a utility company. After the three

steps shown in the pictures have been completed the tank is given a good protective coating of paint.

## Engineering With Timber

NOW, IF EVER, those who advocate "building it of timber" might expect to see their suggestions adopted. If steel is scarce, it is natural to turn to timber—if you can get the timber—especially if the modern "timber connector" construction sponsored by these advocates can be turned to advantage. These connectors, since their introduction, some years ago, have been supplied by the Timber Engineering Co., the wholly owned subsidiary of the National Lumber Manufacturers Association, of Washington, D. C. Devised to avoid the difficulties involved in designing the joint of the timber truss, the connectors have made possible an improved method of timber construction—a revolutionary change, its sponsors claim. The system lends itself, it is said, to prefabrication at a distant plant or to fabrication at the site with unskilled, untrained labor.

## Wire Rope Variety

SIMPLIFICATION of practice in the manufacturing of equipment is one of the things that advances slowly in a democracy like this. In the early twenties the Department of Commerce under Herbert Hoover entered upon its campaign of study to this end. Only last month was it announced that simplified practice had been recommended for the wire-rope industry, as a wartime conservation measure, by the National Bureau of Standards at the request of WPB. The proposal covers only the rope items produced for stocking purposes—totaling 973, which number it is planned would be cut one third. Most wire rope is made and used in four different rope constructions and for these four classes the reduction in variety would be from 352 to 182. The program, which lists sizes, constructions, grades, and breaking strengths, may also serve as a guide for post-war practice.

Simplification has advantages for maker and for user, though it may cramp the style of the chap who wants a special size or model for every little thing.

## Maintaining the Vertical Turbine Pump

▶ *Adaptable to many different applications, the vertical pump has found a widened use in the mining industry. Owing to its inherent features, as compared with those of the reciprocating and centrifugal types, its proper maintenance requires attention to certain points that may be overlooked by those unfamiliar with it. The following discussion of the subject has been written for E.&M.J. by I. Alvin Oliver, consulting engineer for the Joshua Hendy company's Pomona Pump Division in California:*

MODERN ADAPTATION of vertical turbine pumps to mine and mill pumping service has solved many a difficult problem. These units are at times exposed to rough usage and severe conditions, requiring attention to keep them running properly. Essentially, this type consists of a vertical turbine-pump unit supported by a discharge column and drive shaft from a discharge head, to which is connected the discharge pipe and upon which is mounted the vertical motor. The vertical mine sinkers are a portable, close-coupled, electric-driven unit mounted on a sling frame or guides used in shaft-sinking and dewatering operations.

**The Motor**—Much more so than on other electric-driven pumps, the vertical motor forms the heart of the unit. The motors usually are of the hollow-shaft type, the pump drive shaft extending up through the motor shaft and being driven by the keyed drive hub at the upper end of the motor assembly. An adjustment nut on this drive shaft regulates the vertical position of the pump impellers. The thrust bearing which carries the load of the moving parts plus the hydraulic thrust is incorporated into the upper housing of the motor. On some larger jobs, this bearing is sometimes part of the lower housing just above the head. Also, the larger thrust bearings for heavier loads have copper cooling coils.

Care of motor and electrical equipment was discussed in Mine, Shop, and Plant in the June, July, and August issues. In general, what was said can be applied to vertical motors. Most vertical pumps use a.c. induction motors. Simple and sturdy, this type of motor nevertheless should be kept dry, or protected from dripping water or hot, moist atmosphere. Dry, dusty conditions are equally bad, especially if the dust is gritty. Ordinary housing and sealing on standard industrial construction may not be sufficient to protect the motor bearings against gritty dust. In this case, provide felt seals under filling cup covers and keep them tight; also change the oil in the bearings for every 1,000 hr. of service. For extremely dusty conditions, it will be well to provide a dust-tight housing over the entire pump head, and have incoming and outgoing air ducts, with the circulation preferably natural but fan-propelled if necessary. Provide ample circulation to cool the motor.

If the operation is to be in shafts where there may be dripping water and excessive moisture, the motor can be obtained with special insulation for the coils. Assembly parts, end shields, and cover must be provided with protecting flared bonnets and water-tight drip shields. Oil filler and level indicator cups also must be water-tight though accessible for inspection.

In places where the motor head is exposed to rough usage or is in danger from falling objects, protection must be provided for the cooling-coil water supply lines. Under a heavy thrust load, a water-cooled thrust bearing will be seriously damaged if the water stops even for less than 15 min. Water containing sand, silt, or gravel should be filtered clear before being used.

**The Thrust Bearing**—These bearings should have a specially good paraffine-base oil of a weight approximately equal to that of 10 to 20 S.A.E. automobile motor oil. The oil flushing through a ball thrust-bearing acts primarily as a coolant, but on roller plate or Kingsbury-type plate bearings it also forms a film between sliding parts. Viscosity of the bearing oil should range from 200 SSU at 100 deg. F. to 50 SSU at 210 deg. F. Always keep reservoir filled, but never fill higher than the upper level indicated on the filler cup—it may overflow in the oil level tubes inside the motor. Before dismantling the motor head for any reason, the oil in the reservoir must be drained to prevent spilling over these oil-level tubes.

Motor thrust bearings are rated with a liberal safety factor, which takes into account the bearing's expected life. Reliable manufacturers provide sufficient bearing capacity to carry the thrust load at a given speed (r.p.m.) with a continuous service load life of at least five years. This rating is based on the pumping conditions specified on the original order, for which the pump was built. Assuming that it was to deliver 1,000 g.p.m. at 100-ft. total head, direct motor-driven at constant speed, the maker has provided a thrust bearing to carry the given thrust load due to the 100-ft. head. However, should the unit be moved to another job, or an additional discharge line be connected, or should it pump to an elevation of 150 to 160 ft., then pump capacity would drop to 500 to 600 g.p.m. with a 50 percent load increase on the thrust bearing. This may cause bearing failure in a short time. Where conditions are to be changed through higher head or greater speed, it is wise to consult the manufacturer.

(*To be continued*)

# Useful Operating Ideas

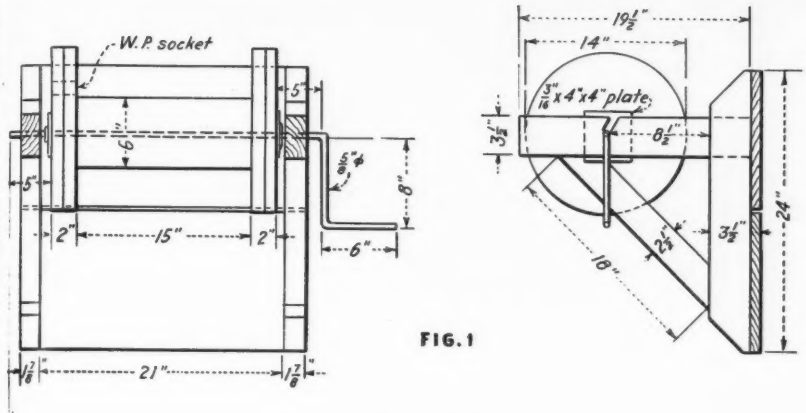



FIG. 1

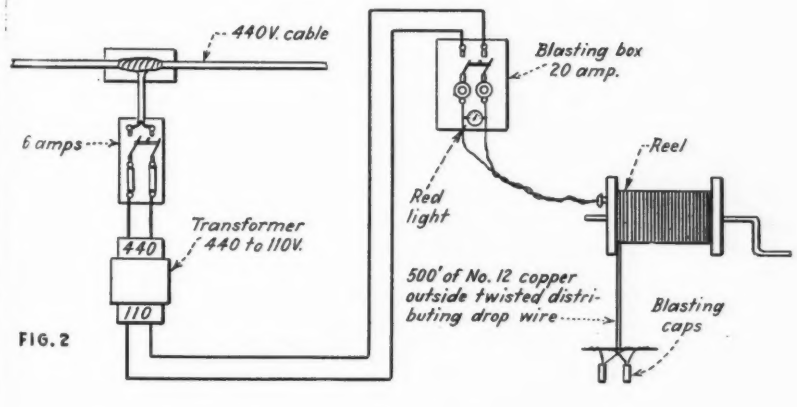



FIG. 2

## Simple Reel for Blasting Wire

A DEVICE that has been found helpful in underground blasting operations at the mines of Anaconda Copper Mining Co., Butte, Mont., is the simple reel shown in Fig. 1 of the accompanying line drawings. It is made from rough mine lumber according to the measurements given, and is designed to hold 500 ft. or more of No. 12 copper outside twisted distributing drop wire. Its place in the general electric blasting layout is explained in Fig. 2.

In the company mines parallel connections are used exclusively, with current usually being taken from the 110-v. lighting circuit. When this is not possible the 440-v. circuit is being resorted to, and the current passed successively through a switch and a transformer reducing the voltage to 110. In each case, the 110-v. current is connected to an inclosed safety blasting switch with No. 12 duplex wire leads to the reel proper. The extension type plug used in the connection is kept out of the reel socket at all times, except when actually blasting. As mentioned before, the reel contains more than 500 ft. of wire for connecting to the working face. This can be reeled in or out as soon as the connection plug has been removed from the reel, which usually is done after blasting (circuit is opened at the blasting switch immediately). Prior to mucking out the face, the wire should be reeled in away from the face and hung in the clear. The reel in turn must be kept at a safe distance from the working face so that if by any accident the extension wire should happen to be "hot," there would be no danger of the men being caught in the blast.

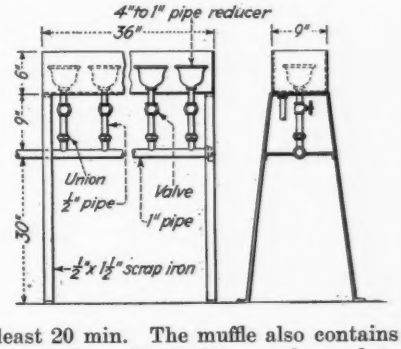
## Cleaning Iron-stained Platinum Wear

STAINED platinum ware is ordinarily cleaned by fusing a little potassium bisulphate in it or by digesting with hydrofluoric acid or a stannous chloride-hydrochloric acid mixture. Howard B. Bradley, analytical chemist of Norton Co., Chippewa, Ont., reports that he has observed iron stains remaining in crucibles cleaned by these methods. The stains are visible only under a nicroscope, but are completely removed only after a prolonged and damaging treatment.

By accident, Mr. Bradley discovered that a single fusion with boric anhydride removes these stains completely. The fusion can be best accomplished, he says, by placing about ½ g. of boric acid in the crucible, dehydrating it at 200 deg. C., and fusing at 900 deg. C.

## Tempering Reconditioned Detachable Bits

CONFRONTED with the task of tempering reconditioned detachable bits properly—a matter of vital importance in view of the slowly decreasing supply of materials and equipment under present war conditions—W. A. Vickers, master mechanic for the Neptune Gold Mining Co., Bonanza, Nicaragua, C. A., solved the problem satisfactorily in the manner to be described and with the equipment shown in the accompanying line drawings. As conventional heating and tempering equipment could not be obtained under current priority restrictions, use was made of a regular assay furnace for heating the bits and a novel spray arrangement for cooling the bits. A slow fire is used in the furnace so that each bit remains in the muffle for at




least 20 min. The muffle also contains a scorifier with broken-up charcoal to take up oxygen. Each bit taken out of the muffle is tested on a Sullivan magnetic indicator, which will show a light at any but the right temperature—namely, 1,470 deg. F. The properly heated bit then is set on one of a set of six inverted sprays adjusted to wet it some ¾ in., and allowed to cool until the bit acquires a blue-black

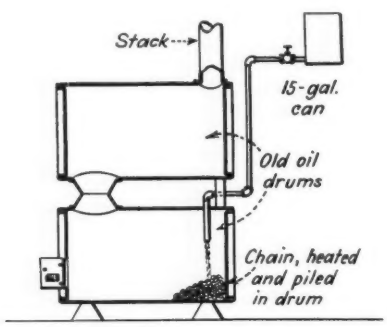
color. When this point is reached, the bit is dumped immediately into a can of boiling water.

The six jets are made from old pipe reducers, 4 in. to 1 in., as shown in the accompanying drawing. The sprays are built by taking pieces of ¼-in. plate, drilling a ⅝-in. hole through them, holding them together with a ⅝-in. bolt, and turning them down and providing them with 4-in. pipe thread in the lathe. Finally the center hole in each disk is welded up again, followed by drilling of 1/16-in. spray holes. To facilitate turning of the disks, each plate or disk is provided with two ¼-in. pins. Each jet is served by an individual valve.

To obtain the best results, the following points should be considered carefully: (1) Heat the bit at least 20 min.; (2) check against magnet, (3) have all sprays at equal height, and (4) have cooling water always boiling. As a check on tempering operations, finished bits are not put in service immediately, but ten bits are given to a driller from each lot, and if they prove satisfactory the rest are given out.

## Keeping a Machine Shop Warm

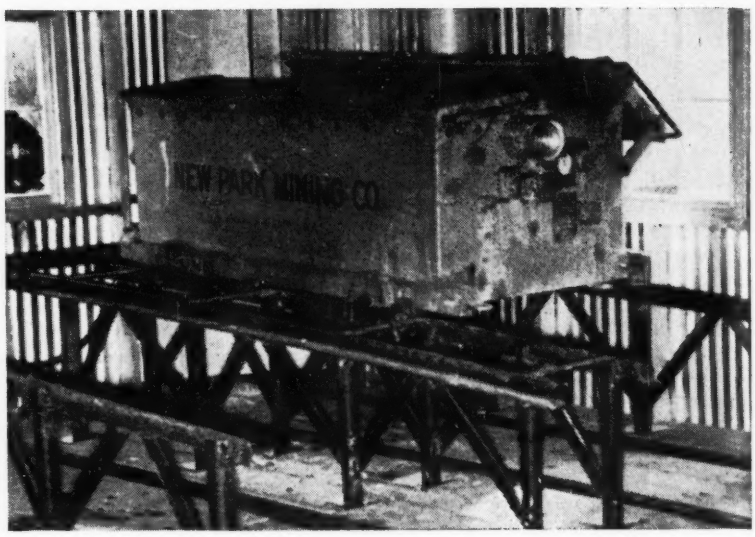
IN THE OPEN PIT of the Bell Asbestos Corp., at Thetford Mines is a general repair shop, 50x20x9 ft., made of salvaged sheet-iron forms used in constructing the company's new No. 2 shaft. After several attempts to heat this shed in winter properly a




successful method was devised by G. Filliom, pit foreman, by a novel furnace design employing empty oil drums, ½ in. pipe, a 15-gal. oil can, a gate valve, and an old piece of chain. The two empty oil drums were welded together by means of supports as shown in the sketch. The 15-gal. oil drum was placed about three feet away from the drums high enough so salvaged crank case oil from it would flow by gravity, the feed being adjusted by the gate valve in the ½-in. pipe line.

The fuel line discharged through the center of the lower drum where the oil would drop onto a link chain (1 to 1½ in. links) about 3 to 4 ft. long. Before the fuel line was opened the chain is heated by a blow torch and placed into the lower drum through the circular stove door. The fuel line was gradually opened, and as the oil dropped onto the hot chain it separated and ignited and gradually built up heat.

This shed was reported kept comfortable for working in cold weather even below zero.



## Storage Battery Changing Simplified

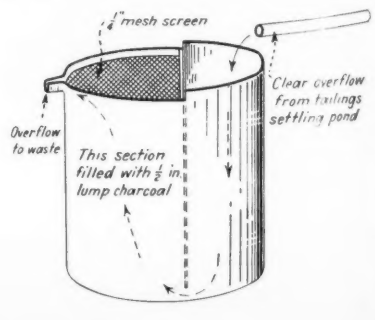
USERS of storage-battery mine locomotives have always been faced with a minor problem in changing from used to fresh batteries, and many operators find it necessary to use a block and tackle and an extra man in order to make the shift. Clark L. Wilson, engineer of the New Park Mining Co., Keetley, Utah, describes a special battery-changing rack in use by his company by means of which the motorman can shift batteries himself with no great difficulty and in a very short time. The installation is shown in the accompanying illustration.

Racks are provided for the batteries of a Mancha Trammer and a Titan "A" motor, the two types in use at present. One line of mine track connects the battery room with the mine haulage system, and when a motor's batteries require charging, it is driven to the battery room and onto a platform set on rollers which can be spotted in front of an empty rack. The motor is then driven ahead into the rack and the batteries are engaged by inclined angle-iron supports placed on either side so that the battery case is freed from the chassis and left in place of the rack. The motorman then withdraws the chassis and switches it to a newly charged battery on the next rack, makes the connections, and drives back to work.

## Charcoal Gold Trap for Cyanide Tailing

RECOVERY of additional gold and silver from the tailings of a cyanide mill can generally be accomplished by use of the device shown in the accompanying diagram, according to R. M. Gammell, Tucson, Ariz. In use during 1939 at the 300-ton cyanide plant of Tom Reed Gold Mines Co., Oatman, Ariz., the trap was set so that overflow water from the tailings settling pond passed through it before returning to the mill. The trap is made of a can or round box of about 20-gal. capacity, as many traps being used as experience indicates are worth while.

Construction of the trap is explained in the diagram. The only precaution which must be observed in using it is to see that slimes do not enter the box, or that clean charcoal is provided if mud does enter. At Tom Reed, the traps were cleaned up as often as regular clean-ups were made; the charcoal was burned, fluxed, and melted along with the regular precipitates.



# Personal Items

**Douglas B. Sterrett,** formerly of Kamloops, B. C., is living at Amelia, Virginia.

**D. E. Thomas** has been appointed government geologist of Tasmania.

**J. P. Norrie** has been made managing director of Purdy Mica Mines, Ltd., operating near Mallawa, Ont.

**Ralph D. Nevett** is in charge of antimony production at Costerfield, Victoria, Australia.

**William J. Hosking** has been elected president of the Western Quebec Mine Managers Association.

**Horace G. Young,** of the Stadacona Mines staff, has been chosen president of the Western Quebec Mine Accident Prevention Association.

**J. P. Bickell,** president of McIntyre Porcupine Mines, Ltd., at Schumacher, Ont., has been elected president of Victory Aircraft, Ltd.

**Frank Cameron,** general manager, La Luz Mines, Ltd., Siuna, Nicaragua, has returned to the property after a stay of several months in the United States.

**Charles V. Harris** was on March 1 appointed flotation plant superintendent for the International Minerals & Chemical Corp. phosphate operations in Florida.

**Anton Gray** has joined the Metals Reserve Co. at Washington, D. C. Prior to his present assignment he was with Selection Trust, London.

**Alex Best,** of Idaho Springs, Colo., has purchased the W. L. Shaffer equipment and good will of the miners' assay office operated for the last quarter of a century at the same location.

**R. H. Farmer** has resigned as superintendent of Francoeur Gold Mines to become plant superintendent of the refinery of Eldorado Gold Mines, Ltd., at Port Hope, Ont.

**C. D. M. Taylor,** recently chief engineer of Ymir Yankee Girl Gold Mines, Ltd., has been made chief engineer of Wartime Metals at the Kootenay Florence property.

**A. H. Honsberger,** until recently manager of Gold Frontier mine, at Red Lake, Ont., is directing the development of Noble Five lead-zinc mine, in the Slocan district of British Columbia.

**Robert C. Pruess** has left the engineering staff of Pend Oreille Mines, Metaline Falls, Wash., to take a position as mill metallurgist with the Vanadium Corp. of America at Monticello, Utah.

**Frank J. Belina,** formerly with the U. S. Bureau of Mines at Moscow, Idaho, and Helena, Mont., has accepted a position with the Board of Economic Warfare in Brazil, in the quartz and mica division.

**R. J. Moore,** mining engineer, well known in the iron districts of Minnesota, has gone to Atikokan, Ont., to supervise operations for RFC at Steep Rock Iron Mines, Ltd.

**E. A. Cappelen Smith,** engineer, a director and member of the firm of Guggenheim Bros., has been awarded Chile's highest civilian decoration, Knight of the Order Al Merito.

**H. J. Evans,** formerly manager for the Lexington Mining Co. at Neihart, Mont., has gone to Washington, where he is with the Board of Economic Warfare.

**W. A. Pakkala,** mining engineer of Bovey, Minn., is superintending work at the Canisteo iron mine, at Coleraine, Minn. He succeeds George Tucker, deceased.

**J. F. Berry** has been appointed manager of the Moctezuma Copper Co. branch of Phelps Dodge Corp. at Nacozari, Mexico, to fill the vacancy caused by the death of A. B. Williams.

**S. Power Warren,** recently with United States Vanadium Corp., has been appointed senior metallurgical engineer for Metals Reserve Co., Washington, D. C.

**Byron S. MacDermid,** mining engineer, recently with Sigma Mines, Ltd., at Bourlamaque, Abitibi district, Que., is now on the staff of the Aluminum Co. of Canada, with headquarters at Arvida, Que.

**George H. Wilson,** lately mine superintendent for Bralorne Mines, Ltd., at Bralorne, B. C., has been transferred to the company's Bramere mine, at Takla Landing, B. C., a cinnabar property at the head of Silver Creek.

**L. K. Brindley** has been elected vice president of Falconbridge Nickel Mines, Ltd., of Toronto, Canada. He recently severed his connection as director and manager of Brandeis, Goldschmidt & Co., of London.

**Thomas Slaughter,** a former mine superintendent on the Cuyuna range, has been engaged as engineer for the Missabe Mountain iron mine, which is preparing for production of iron ore on the Mesabi range.

**J. H. Davis,** manager of New Cornelia branch of Phelps Dodge Corp., at Ajo, Ariz., since February, 1940, has retired for active duty. He is succeeded by **L. M. Barker,** who had been general superintendent of the branch since July, 1942.

**H. A. Brassert,** iron and steel consultant, and three geologists and mining engineers, **Lucien Eaton, C. C. Morfit,** and **Earl K. Nixon,** have just launched a survey of North Carolina's mineral deposits. The project is being sponsored by the State of North Carolina.

**Paul Billingsley** and **Chamberlain W. Hume,** of the Kelowna Exploration Co., Ltd., have been awarded the Leonard Medal for 1942 by the Engineering Institute of Canada, for their paper, "The Ore Deposits of Nickel Plate Mountain, Hedley, B. C."

**Gordon F. MacDonnell,** formerly British Columbia engineer of the Conwest Exploration Co., Ltd., and more recently Washington, D. C., representative of the Metals Controller for Canada, has been appointed to represent Canada on the combined United States-United Kingdom-Canada copper committee.

**S. P. Lowe** has joined the staff of Kalunite, Inc., having its headquarters in Salt Lake City, Utah. Until assuming his new professional post he had been associated with Hudson Bay Mining & Smelting Co., latterly as superintendent of research.

**Ellsworth R. Bennett,** for several years superintendent of mines for Empire Star Mines Co., Ltd., operating near Grass Valley, Calif., has been made assistant to Fred Searls in Washington, D. C., head of Empire Star and executive vice president of Newmont Mining Corp., which has extensive holdings in mining and other properties.

**James K. Richardson,** since the early part of 1942 secretary of the Tri-State Zinc and Lead Ore Producers Association, resigned that post on March 20 last to enter the Army as a first lieutenant. He will be stationed at Camp Wallace, Texas. His successor has not yet been chosen.

**N. F. Parkinson** has been chosen secretary-treasurer of the Ontario Mining Association. He succeeds **George C. Bateman,** now Dominion metals controller. Mr. Parkinson has been secretary-treasurer of Ventures, Ltd., and Falconbridge Nickel Mines since the incorporation of these organizations.

**R. O. Camozzi,** formerly in charge at Jarbidge, Nev., of deep-shaft sinking for Newmont's subsidiary Gray Rock Mining Co., has assumed management of the New Verde Mining Co., also a Newmont enterprise, operating open-cut cinnabar mines and two furnaces in the Ivanhoe district of Elko County, Nev. He succeeds **Bryan R. Frisbie,** who is now with the RFC at Phoenix, Ariz.

**A. D. Chisholm,** general manager of Pickands, Mather & Co., announced in Duluth recently several changes in personnel in the organization. **E. J. Fearing,** superintendent of the Scranton and Dunwoody mines, has been appointed general superintendent of the eastern Mesabi district, and will have charge of the Biwabik, Corsica, and the new Embarrass mines. He will be succeeded in Hibbing by **Abe Mathews,** formerly in charge of the Biwabik and Corsica mines. Mr. Fearing will have as assistants, **C. J. Moe** at the Corsica, **J. N. Shields** at the Biwabik, and **James R. Stuart** at the Embarrass.

## OBITUARY

**Edgar Billings Howard,** geologist and archeologist, died in La Jolla, Calif., on March 18 at the age of 56.

**J. F. Donnell, 72,** mechanical foreman for the Republic Mining & Manufacturing Co., died at Bauxite, Ark., March 1.

**Harry S. Joseph, 76,** mine operator and former chairman of the Salt Lake

Chamber of Commerce mining committee, died March 13 at Salt Lake City.

**L. Vernon Wilson,** formerly chief electrician for the New Cornelia Copper Co. at Ajo, died in Phoenix, Ariz., on Feb. 1.

**William R. McCrea,** widely known Nevada mine owner and operator, died on March 16 at Beatty, Nev., at the age of 78.

**Melvin Brown,** 44, mining engineer for the Park Utah Consolidated Mines at Keetley, died on Feb. 24 in Salt Lake City.

**Charles E. Broan,** aged 79, died at Prescott, Ariz., on Feb. 16. Born in Cornwall, England, he came to the United States in 1863.

**Charles C. Higgins,** veteran prospector and for 19 years mining editor for the *Evening Gazette* of Reno, Nev., died March 19, aged 79 years.

**Max W. Babb,** chairman of the board of Allis-Chalmers Manufacturing Co., and the company's president from 1932 until 1942, died on March 13 in Milwaukee, Wis. He was 68.

**H. Alliston Webster,** for 40 years prominent in phosphate producing and related industries in Tennessee, died on March 20 at the age of 67. Funeral services were held at Columbia, Tenn., on March 21. He is survived by his widow, a son, and daughter.

**F. Adolph Provot,** a retired mining engineer and an alumnus of Columbia School of Mines, class of 1893, died in Tampa, Fla., on March 5. He had been associated with United Verde Copper Mining Co., Phelps Dodge Corp., and Copper Queen Consolidated; for 20 years was consulting geologist for United Verde Extension Mining Co. in Arizona.

**Ernest Gayford,** mining engineer and president of the General Engineering Co., died at his home in Salt Lake City, Utah, March 3, aged 72. Born in England, he came to the United States in 1895 to represent the owners of MacArthur-Forrest cyanide patents, and subsequently served as metallurgist to a number of prominent mining companies in the United States and Mexico. In association with J. M. Callow and others he organized the General Engineering Co. in 1906 and became its president in 1940. He was president also of the company's affiliates, General Engineering Co. of Canada, Ltd., and the British Geco Engineering Co., London. Widely known and respected in his profession, he was also honored in his home city for his participation in civil affairs. He is survived by his widow and two daughters.

# LETTERS

## Rulings Prevent Development of Vanadium Deposits on the Navajo Indian Reservation

*THE EDITOR:*

VANADIUM DEPOSITS on the Navajo reservation in Arizona are believed to be important potential sources of supply to meet the estimated requirements of the Army and Navy for this strategic mineral. This large field is now being developed by only two operators: The Vanadium Corporation of America, and Wade, Curran & Co., pioneers of the carnotite field of the Paradox Valley, Colo. They commenced mining in the Carrizo Mountains, Arizona, about 35 miles west of Shiprock, N. M., as late as last July, and already have produced more than 250,000 lb. of vanadium oxide. They were given prospecting leases upon 280 square miles, but cannot get mining leases on more than 1900 acres.

Experienced prospectors who have been over the Carrizo, Lukachukai, and Navajo Mountains say there is vanadium ore in those hills, but if it is to be developed the Office of Indian Affairs will have to give the prospectors a lease on the ore deposits they find. This the authorities seem unwilling to do. They have a yen for public auctions and knocking down the deposits to the highest bidder.

Congress opened the reservation in 1919 to prospecting and leasing by the white man and issued rules and regulations much like those in Colorado, Utah, and other public land states. Carnotite was then the principal source of radium, and prospectors everywhere were looking for the yellow oxide of uranium ores, which are also rich in vanadium; they had a good market for their mining prospects or the ore.

The carnotite formations near the four-states corner of Colorado, New Mexico, Arizona, and Utah drew prospectors from the famous Paradox Valley. They found ore in pockets and thin beds ranging from 6 to 15 percent vanadium oxide. But, they were looking for uranium and radium, the big money ore of that era. By the fall of 1922, more than 250 mining claims had been located and leases obtained upon more than 60. Then came the collapse of the radium ore boom, and the Arizona carnotite fields were abandoned.

In 1934, Congress gave the Indians a New Deal law, under which Secretary Ickes withdrew the lands from prospecting and leasing. After more than four years doing nothing, Congress, in 1938, opened the reservation to leasing, and after another year (late in 1939) opened the lands to limited prospecting.

In April, 1941, the Office of Indian Affairs ruled that carnotite deposits are not lode claims, in spite of the rulings of courts and geologists, so they raised to 960 acres (instead of 640 acres) the total acreage any person, firm, or corporation might hold in any one state. And, so that everybody would have an equal opportunity, they decreed that geologists should select the deposits which should be leased at public auction to the highest bidder.

They must have been amazed when they found that prospectors and miners stayed away from the auctions and gave their time and energy to other vanadium fields, where they might easily gain title and possession of the orebodies they discovered.

In order to encourage the discovery and development of vanadium ore deposits, the Metals Reserve Co. operates vanadium oxide extraction works in ore centers, such as Durango, Colo., Monticello, Utah, and Rifle, Colo., and makes contracts with mine operators for their output at good prices, advancing liberal amounts of capital and mining equipment, and permitting a profit for the development of new or marginal ore properties.

This wise and generous policy will surely be successful, and the mine operators will cooperate with them in putting it over. But the Office of Indian Affairs will have to break the foolish bottleneck it blew in April, 1941—in other words, it will have to open the Navajo Indian reservation to prospecting and filing as it was in the early nineteen twenties. If this is done, there will be 20 operators in the vanadium ore fields of the reservation in 60 days, and most of them will make good, fair profits. THOMAS F. V. CURRAN

*Farmington, N. M.*

## Patents and Publishing

*THE EDITOR:*

A NUMBER of engineers have asked me from time to time what danger, if any, was incurred in publishing articles describing purported inventions. The danger referred to was, of course, loss of the opportunity of securing patent protection for the inventions.

As a general rule, to use the language of the patent law, if the publication of the description of the invention, assuming that there be one, amounts to an anticipation (discussed hereafter), then such anticipation constitutes a statutory bar to the acquisition of a valid patent.

The Revised Statutes, Title LX, Sec. 4886 as amended, state that

"Any person who has invented or discovered any new and useful art, machine, manufacture, or composition of matter, or any new and useful improvements thereof, . . . not known or used by others in this country, before his invention or discovery thereof, *and not* patented or *described in any printed publication in this or any foreign country,* before his invention or discovery thereof or *more than one year prior to his application,* and not in public use or sale in this country for more than one year prior to his application, unless the same is proved to have been abandoned, may, upon payment of the fees required by law, and other due proceeding had, obtain a patent therefor." (Italics mine.)

In other words, an inventor who has published a description of his invention may still obtain a valid patent for his invention if he files an application for patent in the United States Patent Office within one year of the date when the description was first published.

The language of the statute does not of course define what constitutes a "printed publication." Articles pub-

lished in magazines, books, transactions, journals, and the like may be safely said to be publications. Ordinarily, any printed article published in a form that is accessible to the public is a printed publication.

As stated hereinbefore, the printed publication to be a bar must amount to an anticipation. A printed publication to constitute an anticipation must describe the invention to such an extent that any person "skilled in the art" to which the invention relates can, by following the description in the publication, put the invention into practice. If the person "skilled in the art" to which the invention relates cannot put the invention into practice by following the description in the publication, then the publication does not amount to an anticipation and the publication is not a statutory bar. Obviously, this is the rule tersely stated; but any one familiar with patent prosecution and with patent litigation will realize that considerable argument may arise from what constitutes "putting into practice," a person "skilled in the art," etc.

To summarize, an inventor, by publishing a description of his invention in printed form, may lose the opportunity of securing patent protection for his invention, provided:

1. He publishes the description more than one year prior to the filing date of the application for letters patent in the United States Patent Office, and

2. The description is sufficiently complete that one skilled in the art to which the invention relates may put the invention into practice by following the description of the invention in the publication.

The foregoing, clearly, is an outline of the broad principles involved and barely scratches the surface, as it were, of this phase of patent law. I believe, however, that it answers broadly the question that must constantly arise in the minds of inventors-authors.

GUY R. M. DEL GIUDICE,
Metallurgical Engineer and Patent Attorney

*Rockville Center, N. Y.*

## Mining and Post-War Policies

*THE EDITOR:*

THIS letter is written in reference to the much-discussed post-war planning, particularly the practical application of the "Atlantic Charter" to the metal-mining industry of the United States.

I am assuming—and I think few will disagree—that in spite of the need for rebuilding our peace-time industries the demand for metals after the war will not be so great as it is at present; also that shipping conditions will again be similar to those which prevailed prior to the war (except that freight rates will doubtless be somewhat higher); and lastly that our miners, millmen, and smelter men will expect to receive approximately the present scale of wages even though they may revert to the 40-hour work-week.

Even before the war, and while paying much lower wages, our domestic mines with but few exceptions could not have operated in competition with the foreign producers of copper, lead, zinc, mercury, manganese, tungsten, and many other metals except for tariff protection, and there is not the slightest reason to believe that they can do so in the future.

Moreover, during this war period we have been instrumental in developing enormous new reserves of metallic ores in foreign lands, such as iron in Brazil, lead and zinc in Mexico, and many deposits of the lesser metals.

Most of us recognize the probability that even if we should return to pre-war conditions, most of the high-cost producers, whose present activity has been made possible by government loans and premium prices, will have to close down for an indefinite period; but if the former tariff barriers are removed, what will be the competitive position of the greater part of the pre-war producers of metals of which we still have an abundant supply?

Perhaps domestic gold and silver will still be purchased at fixed prices by the government. Probably domestic molybdenum mines can continue to produce that metal at a lower cost than any foreign competitor; the largest iron mines will have the advantage of location, equipment, and transportation to the furnaces and industrial centers; a few of the great copper mines may still compete with copper from South America and Africa; but by and large all American mines are going to be handicapped by the highest scale of wages that has ever been known plus burdensome taxes and regulations regarding working time and conditions.

If the tariff protection is to be eliminated, as many of the internationally minded officials in Washington now forecast, will it not inevitably result that the normal peace-time demand for nearly every major and minor metal can be supplied more cheaply by imports from foreign sources than by domestic producers?

If any thorough job of planning for the post-war mining industry is to be undertaken it seems to me that the first procedure should be to examine carefully the relative domestic and foreign situation of each metal separately, with a view to making concrete recommendations in respect to post-war tariff policies, for on these must largely depend the continuance of domestic production of many metallic ores and the fate of many mining camps that will become ghost towns if we establish a general policy of free trade.

Obviously, similar surveys should also cover all other raw materials such as lumber, cotton, wool, sugar, grain, meats, and hides, as well as the processing and manufacturing of the most important commodities of commerce.

Our President has given assurance of his intention that the men and women who are now in uniform and those who are otherwise engaged in war work will find gainful occupation in peace-time industries; but if these are once again to be governed by the law of supply and demand, the fundamental principles of domestic and international trade cannot be subordinated to even the most praiseworthy intentions toward the people of other nations.

It seems unlikely that the altruism of the American farmer and wage earner will impel them to give up voluntarily many of the advantages which they have enjoyed in the past after the fear of being forcibly deprived of them has once been removed, or that they will fail to realize the impossibility of maintaining our present American standard of living if they must compete for the domestic market with peoples whose standards are far inferior.

The reduction of inequalities which may lead to future wars is a large and complicated problem that can be solved only by fairly facing facts and consequences. As Madam Chiang Kai-shek has so well said, "We must have vision without being visionary."

G. M. COLVOCORESSES

*Phoenix, Ariz.*

## Iron Ore in Africa

*THE EDITOR:*

IN HIS first article on the great Brazilian iron ore deposits, *E.&M.J.*, December, 1942, Mr. A. Malozemoff said that the Brazilian, Lake Superior, and Siberian were the three greatest iron ore deposits in the world. I have seen in Central Africa iron-ore deposits of unusual size, and, judging from appearance, of good grade.

I was in the Belgian Congo in 1912, '13, and '14, where I was engaged in prospecting for Forminière, a Belgian company that was operating the Babeyru placer. The iron-ore deposits to which I refer are in the Babeyru placer mining district in the northeastern part of the Belgian Congo, located about three days' march, 45 to 50 miles, from Avakubi on the Ariwimi River and about an equal distance from Bomili. No careful effort was made to trace the extent of the iron-ore deposits, because at the time I was looking for placer ground. There is no doubt, however, that the iron-ore deposits are extensive. Large bold outcrops were in evidence where the ground was heavily eroded. Rising 1,000 to 2,000 ft. above Big Imva Creek a ridge of iron ore from 300 to 1,800 ft. wide extends continuously for 5 or 6 miles. The ore bodies are vertical and appear to be a replacement of the schist. The great extent of the latter would indicate the possibility of iron-ore deposits of greater extent than appear on the surface. The region is one of dense forestation and heavy rainfall.

WILLIAM CROCKER

*Prescott, Ariz.*

## Minerallurgy

*THE EDITOR:*

I NOTE in the November, 1942, issue of *Engineering and Mining Journal* the suggestion of R. L. Kidd that a new term, "minerallurgy," would be found useful by the profession. It may interest you and Mr. Kidd to know that the term has long since been adopted by Spanish mining engineers and that it is used in the texts of the School of Mines at Madrid.

CESAR DE MADARIAGA

*Bogota, Colombia*

# Summary of the MARKETS

PRICE CHANGES in non-ferrous metals during March were unimportant, and the *E. & M. J.* index remained unchanged at 88.74 for the seventh consecutive month. A minor price change occurred when OPA restored the $10 per ton differential on sales of primary lead sold as ingots and linked ingots. The spread was reduced to $5 per ton last January, but it developed that the price proved inadequate and was choking off production of lead in ingot form. Ingots and linked ingots of lead, used largely by the plumbing trade, are not a large tonnage proposition.

Effective April 3, OPA established the ceiling price of copper sulphate at $5 per 100 lb., a reduction of 15c. from the selling basis that had been in force since Feb. 1, 1941. Some of the smaller producers, who have been compelled under war conditions to switch to lower grades of copper-bearing material, thereby raising costs, may be forced to restrict production, trade authorities claim.

## UNITED STATES MARKET

| 1943 | Electrolytic Copper | | Straits Tin | Lead | | Zinc |
|---|---|---|---|---|---|---|
| | Domestic | Export | New | New | | |
| Mar. | (a) Refinery | (b) Refinery | York | York | St. Louis | St. Louis |
| 1 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 2 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 3 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 4 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 5 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 6 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 8 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 9 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 10 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 11 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 12 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 13 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 15 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 16 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 17 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 18 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 19 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 20 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 22 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 23 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 24 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 25 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 26 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 27 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 29 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 30 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 31 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| | | | AVERAGES FOR MONTH | | | |
| Mar. | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| Mar. | | | AVERAGES FOR WEEK | | | |
| 3 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 10 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 17 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 24 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 31 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| Mar. | | | CALENDAR WEEK AVERAGES | | | |
| 6 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 13 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 20 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 27 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |

## SILVER, GOLD AND STERLING EXCHANGE

| 1943 | Sterling Exchange | | Silver | | Gold | |
|---|---|---|---|---|---|---|
| | "Checks" | "90-day | (c) | | | (d) United |
| Mar. | (Nominal) | demand" | New York | London | London | States |
| 1 | 401.000 | (f) | 44.750 | 23.500 | 168s | $35.00 |
| 2 | 401.000 | (f) | 44.750 | 23.500 | 168s | 35.00 |
| 3 | 401.000 | (f) | 44.750 | 23.500 | 168s | 35.00 |
| 4 | 401.000 | (f) | 44.750 | 23.500 | 168s | 35.00 |
| 5 | 401.000 | (f) | 44.750 | 23.500 | 168s | 35.00 |
| 6 | 401.000 | (f) | (e) | (e) | (e) | 35.00 |
| 8 | 401.000 | (f) | 44.750 | 23.500 | 168s | 35.00 |
| 9 | 401.000 | (f) | 44.750 | 23.500 | 168s | 35.00 |
| 10 | 401.000 | (f) | 44.750 | 23.500 | 168s | 35.00 |
| 11 | 401.000 | (f) | 44.750 | 23.500 | 168s | 35.00 |
| 12 | 401.000 | (f) | 44.750 | 23.500 | 168s | 35.00 |
| 13 | 401.000 | (f) | (e) | (e) | (e) | 35.00 |
| 15 | 401.000 | (f) | 44.750 | 23.500 | 168s | 35.00 |
| 16 | 401.000 | (f) | 44.750 | 23.500 | 168s | 35.00 |
| 17 | 401.000 | (f) | 44.750 | 23.500 | 168s | 35.00 |
| 18 | 401.000 | (f) | 44.750 | 23.500 | 168s | 35.00 |
| 19 | 401.000 | (f) | 44.750 | 23.500 | 168s | 35.00 |
| 20 | 401.000 | (f) | (e) | (e) | (e) | 35.00 |
| 22 | 401.000 | (f) | 44.750 | 23.500 | 168s | 35.00 |
| 23 | 401.000 | (f) | 44.750 | 23.500 | 168s | 35.00 |
| 24 | 401.000 | (f) | 44.750 | 23.500 | 168s | 35.00 |
| 25 | 401.000 | (f) | 44.750 | 23.500 | 168s | 35.00 |
| 26 | 401.000 | (f) | 44.750 | 23.500 | 168s | 35.00 |
| 27 | 401.000 | (f) | (e) | (e) | (e) | 35.00 |
| 29 | 401.000 | (f) | 44.750 | 23.500 | 168s | 35.00 |
| 30 | 401.000 | (f) | 44.750 | 23.500 | 168s | 35.00 |
| 31 | 401.000 | (f) | 44.750 | 23.500 | 168s | 35.00 |
| | | | AVERAGES FOR MONTH | | | |
| Mar. | 401.000 | ..... | 44.750 | 23.500 | ..... | 35.00 |
| Mar. | | | AVERAGES FOR WEEK | | | |
| 3 | 401.000 | ..... | 44.750 | ..... | .... | ..... |
| 17 | 401.000 | ..... | 44.750 | ..... | .... | ..... |
| 24 | 401.000 | ..... | 44.750 | ..... | .... | ..... |
| 31 | 401.000 | ..... | 44.750 | ..... | .... | ..... |

Calendar week averages, New York Silver: March 6th, 44.750; 13th, 44.750; 20th, 44.750; 27th, 44.750.

(e) Not quoted (Saturday). (f) No quotation.

THE above quotations for major non-ferrous metals are our appraisal of the important United States markets, based on sales reported by producers and agencies. They are reduced to the basis of cash, New York or St. Louis, as noted. All prices are in cents per pound.

*(a)* Net prices at refineries on Atlantic seaboard. To arrive at the delivered New England basis add 0.225c. per pound, the average differential for freight and delivery charges.

*(b)* Export prices are net at refineries on the Atlantic seaboard and include sales of domestic copper in the foreign market. Owing to the World War and the disruption of normal trade relations, our export copper quotations, since September, 1939, have been based largely on f.a.s. transactions, ex United States ports. We deduct .05c. from the f.a.s. basis (lighterage, etc.) to arrive at the f.o.b. refinery quotation.

Copper, lead and zinc quotations are based on sales for both prompt and future deliveries; tin quotations are for prompt delivery only.

Quotations for copper are for the ordinary forms of wirebars and ingot bars; cathodes are sold at a discount of 0.125c.

Quotations for zinc are for ordinary Prime Western brands. Zinc in New York commands a premium over the St. Louis basis equal to the freight differential. Contract prices for High Grade zinc delivered in the East and Middle West in nearly all instances command a premium of 1c per pound over the current market for Prime Western but not less than 1c over the *Engineering and Mining Journal's* average quotation for Prime Western for the previous month.

Quotations for lead reflect prices obtained for commond lead, and do not include grades on which a premium is asked.

*(c)* Silver other than newly-mined domestic, by Handy & Harman. Under Treasury order of July 6, 1939, the price on domestic newly-mined silver mined subsequent to July 1, 1939, was fixed at 71.11c per troy ounce. Handy & Harman's quotation on newly-mined domestic silver, 999 fine was 70⅝c. throughout March.

*(d)* U. S. Treasury's gold price. Actual payment by the United States Treasury for gold in domestic and imported ore or concentrate is at 99.75 per cent of the price quoted by the Treasury, which at present is equal to $34.9125.

WPB placed cobalt, metallic calcium, and ferrocolumbium under allocation. The use of osmium, one of the metals in the platinum group, has been prohibited except for the manufacture of electrical contacts for the aircraft industry.

Copper allocations for the month of April were announced by the Copper Division of WPB on March 15, much to the satisfaction of those members of the trade charged with arranging for the actual distribution of the metal. Total supply of new copper from domestic and foreign sources available for consumption in this country during the first quarter of the year was larger than in the same period last year.

Zinc production continued to increase. Lead supply is generally viewed as comfortable. Antimony restrictions were eased moderately.

Quicksilver production in the United States, Canada, and Mexico was maintained at a high rate in the Jan.-March period, despite the winter weather conditions. War demands have been heavy.

## MONTHLY AVERAGES

Monthly averages for copper, lead, zinc, tin, silver (New York and London), gold, and sterling exchange appear on preceding page. Average prices of miscellaneous metals for February and March follow:

| | Feb. | Mar. |
|---|---|---|
| Quicksilver, N. Y. flask | 196.000 | 196.000 |
| Antimony (a) | 16.049 | 16.049 |
| Antimony, bulk, Laredo | 14.500 | 14.500 |
| Antimony, bulk, N. Y. | 15.509 | 15.509 |
| Antimony, Chinese (b) | 16.500 | 16.500 |
| Platinum, oz. troy | 35.000 | 35.000 |
| Cadmium (c) | 90.000 | 90.000 |
| Cadmium (d) | 92.500 | 92.500 |
| Cadmium (e) | 95.000 | 95.000 |
| Aluminum, ingot | 15.000 | 15.000 |
| Magnesium, ingot | 20.500 | 20.500 |

(a) New York, packed in cases, in lots of 5 tons or more but less than a carload. (b) Nominal. (c) Producer's price for commercial sticks. (d) Average of producer's and plater's quotations. (e) Special shapes sold to platers.

## E & M J PRICE INDEX

Weighted index of non-ferrous metal prices (copper, lead, zinc, tin, silver, nickel, and aluminum). The average for the years 1922-1923-1924 equals 100.

| | | | |
|---|---|---|---|
| 1929 | 110.33 | 1936 | 73.45 |
| 1930 | 82.87 | 1937 | 90.86 |
| 1931 | 60.20 | 1938 | 73.67 |
| 1932 | 48.26 | 1939 | 77.71 |
| 1933 | 59.79 | 1940 | 79.22 |
| 1934 | 69.59 | 1941 | 83.49 |
| 1935 | 74.66 | 1942 | 86.80 |

| | 1941 | 1942 | 1943 |
|---|---|---|---|
| January | 82.48 | 85.39 | 88.74 |
| February | 82.76 | 85.90 | 88.74 |
| March | 83.27 | 85.90 | 88.74 |
| April | 83.48 | 85.90 | .... |
| May | 83.51 | 85.90 | .... |
| June | 83.48 | 85.90 | .... |
| July | 83.60 | 85.90 | .... |
| August | 83.39 | 85.90 | .... |
| September | 83.34 | 88.74 | .... |
| October | 83.84 | 88.74 | .... |
| November | 84.32 | 88.74 | .... |
| December | 84.42 | 88.74 | .... |

## CURRENT PRICES—MISCELLANEOUS METALS, ORES, AND NON-METALLIC MINERALS

Quotations cover wholesale lots, prompt shipment, f.o.b. New York, unless otherwise stated

(April 1, 1943)

### MISCELLANEOUS METALS

| | |
|---|---|
| **Aluminum,** ingot, 99 plus per cent, lb | 15c |
| **Antimony,** domestic, spot, lb. 5 ton or more | 16.049c. |
| **Bismuth,** ton lots, lb | $1.25 |
| **Cadmium,** commercial sticks, lb | 90c. |
| **Calcium,** lb., ton lots 97 @ 98 per cent | $1.25 |
| **Chromium,** 97 per cent grade, lb | 89c. |
| **Cobalt,** 97 to 99 per cent, per lb | $1.50 |
| **Nickel,** electrolytic cathodes, lb | 35c. |
| **Magnesium,** 99.8 per cent, carloads, lb | 20½c. |
| **Palladium,** troy oz | $24.00 |
| **Platinum,** (Official quotation) troy oz | $35.00 |
| **Quicksilver,** flask of 76 lb., 100 flasks or more | $196.00@$198.00 |
| **Radium,** mg. radium content | $25.00@$30.00 |
| **Selenium,** 99.5 per cent, lb | $1.75 |
| **Silicon,** minimum 97 per cent, spot, carloads lb | 14.75c. |
| **Tellurium,** lb | $1.75 |
| **Thallium,** 100 lb. or more, lb | $10.00 |
| **Titanium,** 96 to 98 per cent, lb | $5.00 |

### METALLIC ORES

| | |
|---|---|
| **Beryllium Ore,** 10 to 12% BeO. f.o.b. mines, ton (b) | $80.00@$100.00 |
| **Chrome Ore,** per long ton, f.o.b. cars Atl. ports, dry, 48% $Cr_2O_3$, 2.8 to 1 ratio | $41.00 |
| 48% $Cr_2O_3$, 3 to 1 ratio | $43.50 |
| **Iron Ore,** Lake Superior, Lower Lake ports, long ton: | |
| Old Range bessemer | $4.75 |
| Mesabi bessemer | $4.60 |
| Old Range non-bessemer | $4.60 |
| Mesabi, non-bessemer | $4.45 |
| **Lead** (Galena) 80 per cent, Joplin, Mo., ton | $76.54 |
| **Manganese** (dutiable) f.o.b. cars Atl. ports, long ton unit Mn: | |
| 50 per cent | 79.8c. |
| 48 per cent | 78.8c. |
| 46 per cent | 76.8c. |
| **Manganese Ore,** domestic, 48%, f.o.b. mines, l.t. unit | 96c.@$1.00 |
| **Molybdenum Ore,** 90%, per lb. of $MoS_2$, f.o.b. mines | 45c. |
| **Tungsten Ore,** per unit of $WO_3$: | |
| Chinese, 65 per cent, duty paid | (b) $24.00 |
| Domestic, 65 per cent and upward | (a) $26.00 |
| **Vanadium Ore,** per lb. of contained $V_2O_5$ f.o.b. mines | 27.50c |
| **Zinc Ore,** Prime, 60 per cent concentrate, Joplin, Mo; per ton | $55.28 |

(a) Prices at mines, small lots, usually several dollars less. (b) Nominal

### METALLIC COMPOUNDS

| | |
|---|---|
| **Arsenious Oxide** (arsenic) lb | 4c. |
| **Cobalt Oxide,** 70 @ 71 per cent, lb | $1.84 |
| **Copper Sulphate,** 100 lb | $5.00 |

### ALLOYS

| | |
|---|---|
| **Beryllium Copper,** 2.5 to 3 percent Be, per lb. of contained Be | $15.00 |
| **Ferrochrome,** 65 @ 70 percent per pound of Cr contained | 13c. |
| **Ferromanganese,** 78 @ 82 per cent, gross ton | $135.00 |
| **Ferromolybdenum** 55 @ 65 per cent Mo. lb. of Mo. contained | 95c. |
| **Ferrosilicon,** 50 per cent, gross ton | $74.50 |
| **Ferrotungsten,** 75 @ 80 per cent, lb. of W contained | $1.90 |
| **Ferrovanadium,** per lb. of V, delivered | $2.70@$2.90 |
| **Silicomanganese,** 1½ per cent C, gross ton | $135.00 |

### NON-METALLIC MINERALS

| | |
|---|---|
| **Asbestos,** f.o.b. Canadian (Quebec) mines (U. S. funds), ton: | |
| Crude No. 1 | $650@$750 |
| Crude No. 2 | $165@$385 |
| Spinning fibers | $124@$233 |
| Paper stock | $44@$49.50 |
| Shorts | $14.50@$26.50 |
| Vermont, f.o.b. Hyde Park: | |
| Shingle stock | $62.50@$65.00 |
| Paper stock | $44.00@$53.00 |
| Shorts | $14.50@$28.50 |
| Floats | $19.50 |
| **Barytes,** long ton: | |
| Georgia, crude | $8.50@9.00 |
| Missouri, 93 per cent $BaSO_4$, less than 1 per cent iron | $6.75@$7.25 |
| **Bauxite,** long ton: | |
| Domestic, crude, 50 @ 52 per cent (not dried) | $5.00 |
| Domestic, chemical, 55 @ 58 per cent | $7.50@$8.50 |
| Domestic, abrasive, 80 @ 84 per cent | $16.00 |
| **China Clay,** f.o.b. mines, ton: | |
| South Carolina and Georgia, No. 1, bulk | $6.75@$8.00 |
| Delaware, No. 1 | $15.00 |
| **Feldspar,** bulk, ton: | |
| Potash feldspar, 200 mesh | $17.00 |
| Glass-spar, white, 20 mesh | $11.75 |
| **Fluorspar,** f.o.b. mines, bulk, Kentucky and Illinois 85–5 per cent, all rail movement, ton | $28.00 |
| Ground, 95 @ 98 per cent, bulk, ton | $34.00 |
| Acid, 98 and 1 per cent, bulk, ton | $35.00 |
| **Fuller's earth,** f.o.b. Georgia or Florida, ton | $7.00@$14.00 |
| **Magnesite,** per ton dead-burned, f.o.b. Washington | $22.00 |
| **Mica,** per lb., North Carolina, No. 1 and 2 quality: | |
| 1½ x 2 in | 90c. @$1.20 |
| 2 x 2 in | $1.50@$2.00 |
| 3 x 3 in | $2.00@$2.75 |
| 3 x 4 in | $2.50@$3.25 |
| 3 x 5 in | $3.00@$4.00 |
| White, ground, ton | $60.00@$80.00 |
| **Ocher,** Georgia, ton | $19.00@$22.00 |
| **Pyrites,** Spanish, per long ton unit of S, c.i.f. Atlantic ports | 12c., nom. |
| **Silica,** in bags, 325 mesh, ton | $20.00@$40.00 |
| **Sulphur,** Texas, mines, long ton | $16.00 |
| **Talc,** f.o.b. works, ton: | |
| New York, double air-floated, 325 mesh | $12.00@$15.00 |
| Vermont, extra white, 200 mesh | $9.50@$10.50 |
| **Tripoli** Missouri, ton: | |
| 40 mesh, cream colored | $14.50 |
| 200 mesh, cream colored | $26.00 |

### IRON AND STEEL

| | |
|---|---|
| **Pig Iron,** Valley furnaces, gross ton: Basic | $23.50 |
| **Steel,** base prices, Pittsburgh Billets, gross ton | $34.00 |
| Structural shapes, 100 lb | $2.10 |

# New Books

AERIAL PHOTOGRAPHS: THEIR USE AND INTERPRETATION. *By A. J. Eardley. Harper & Bros., New York. Pp. 200. Price $2.75.*

THIS CONCISE, clear presentation of how aërial maps are made and how they can be used will fill a need by geologists and mining engineers for understanding of a technique which is becoming increasingly valuable in the search for and mapping of mineral deposits. Aërial maps are now available from government sources for a considerable portion of the country, and have in many circumstances proved to be more useful than contour maps to geologists and engineers. The book also discusses geological maps, outcrop patterns, tracing contacts, the making of contour maps from aërial photographs, structure contour maps, interpretation of culture, and reconnaissance mapping. It is suitable as a college text and is liberally illustrated, having 46 photographic plates and 46 diagrams.

THE BLAST FURNACE. *By Roy B. Hudson. Chemical Publishing Co., New York. Pp. 254. Price $3.*

IN A FOREWORD by Ralph H. Sweetser, consultant in blast-furnace practice, the author is commended for giving special attention to a phase of blast-furnace operation that has hitherto been published only in scattered papers—namely, accurate knowledge of the composition of all ingredients entering into the production of pig iron. Hence, it is not surprising to find more than half the book devoted to raw materials, with particular emphasis on blast-furnace fuels. Sample calculations for burdening the furnace are given in detail. Relatively little attention is given to the products and byproducts of the furnace process, but more extended treatment is given to the sampling and analysis of raw materials and furnace products.

GREEN FIRE. *By Peter W. Rainier. Random House, New York. Pp., 296. Price 2.75.*

THIS BOOK, a non-technical true adventure story of emerald mining in Colombia, cannot adequately be reviewed by anyone familiar with the mining industry. Because one can name off-hand at least a dozen mining engineers whose adventures have equaled or surpassed those related by Mr. Rainier, one is likely to be rather unimpressed and therefore perhaps unfair in considering his stories of wild canoe rides, treks through the jungle, emergency operations, and battles with bandits. A lay reader, on the other hand, might well be shocked, dismayed, or even thrilled by these revelations, so foreign to anything he has ever met or heard of, and it is difficult to say to what an extent "Green Fire" would interest those outside the trade, so to speak. At that, not even many mining engineers have tackled a strictly amateur embalming job with rum as the only fluid available, and the explosive results achieved by Mr. Rainier in his stab at it will, I think, interest anybody. Incidentally, that he did tackle the job testifies to his possession of the versatility and resourcefulness for which mining engineers are famous.

The writing of the book has suffered somewhat from Mr. Rainier's fondness for extracting the last grain of color and drama from each scene he confronts. This is most noticeable when he stands still and describes some more or less static condition of nature, such as a deep valley or a wild rapids. At these points he showers adjectives and similes all over the page and the narrative, perforce, sits and waits until the flood subsides. It is when he gets back into straight abrupt action that he is at his best. He can make you see the head of the striking snake, or the Indian nursing his smashed hand in the darkened hut, and that, after all, is as much as any writer can do. His style is strongly flavored with pulp-magazine dramatics, but it is a style which obviously matches his own attitude toward his adventures and is therefore sincere. All in all, Mr. Rainier has written a good book and you'll probably like it.

PRINCIPLES OF METALLOGRAPHIC LABORATORY PRACTICE. *By George L. Kehl. McGraw-Hill Book Co., New York and London. Pp. 453. Price $4.*

IN THIS, the second edition of Professor Kehl's book, the author has followed the original purpose of providing fundamental treatment of principles in order to bridge the gap between theoretical physical metallurgy and its practical application in the laboratory. The contents include preparation and etching of specimens for microscopic examination; metallurgical microscopes and photomicrography; principles of photography; macroscopic examination of metals; hardness testing; special metallurgical tests; principles of pyrometry; and thermal analysis.

BOOM COPPER. *By Angus Murdoch. The Macmillan Company, New York. Pp.* 250. *Price* $3.

IN THIS STORY of the first mining boom in the United States, a free-lance writer has made a welcome addition to the historical literature of the mining industry. It follows the fortunes of the Michigan Copper Country from its legendary beginnings, through the heyday of Calumet & Hecla, down to the sombre days of the depression of the nineteen-thirties, and the modest revival of activity as the second World War created an insatiable demand for copper. The copper boom on the Keweenaw Peninsula occurred in 1843, six years before the gold rush to California, and inaugurated a century of mining operations unique in the history of the industry. In the course of his researches the author has captured the romance and drama of a young and virile mining region and has portrayed its life and leading characters in a fascinating manner. The Cliff mine, first dividend payer, developed by a Pittsburgh pharmacist; Jim Paul's boulder; mass copper in the Minnesota; the fabulous Silver Islet; the rise and fall of Ed. Hulbert; Boston Back Bay blue-bloods and the Calumet & Hecla; the tragic labor troubles engendered by Charles H. Moyer and the Western Federation of Miners; all these incidents, and more, too, in the history of the Michigan copper country make attractive reading, especially for mining men.

WORKERS AND BOSSES ARE HUMAN: COLLECTIVE BARGAINING AT WORK. *By T. R. Carskadon. Public Affairs Committee, 30 Rockefeller Plaza, New York, N. Y. Pp.* 32. *Price* 10¢.

MORALE as the prime factor in the productive efficiency of workers is the theme of this pamphlet. It poses the question "What do men work for?" and derives its answer from the scientific studies and conclusions contained in three books: "Fatigue of Workers," by the Committee on Work in Industry of the National Research Council; "The Dynamics of Industrial Democracy," by Clinton S. Golden and Harold J. Ruttenberg; and "How Collective Bargaining Works," a survey of present practices published by the Twentieth Century Fund. In his analysis of the subject the author deduces and emphasizes guiding principles that can be accepted by both workers and bosses, labor and management.

## PUBLICATIONS
### RECEIVED

*Tungsten Map.* California Division of Mines, Ferry Building, San Francisco, announces that its new tungsten map of California is ready. It will be included in the next issue of the California Journal of Mines and Geology. The map can be purchased separately at 60c. plus tax.

*The State of Washington.* Stevens and Pend Oreille Counties. Catalog of mines and mineral locations in the area, showing ownership, production possibilities, and transportation facilities. Available on request to the Secretary of Stevens County, Colville, Washington; the Secretary of Pend Oreille County, Newport, Washington, or from the Colville Engineering Co., Colville, Washington.

*Chamber of Mines of Rhodesia.* Third annual report for the year 1941. Production and other data. Bulawayo, Rhodesia, South Africa.

*Collapse or Boom at the End of the War.* By Harold G. Moulton and Karl Schlotterback. An analysis of conditions prevailing after three wars, and a consideration of favorable or unfavorable factors affecting the United States economy after the present war. Published by the Brookings Institution, Washington, D. C. Price 25c.

*Kaolin Deposits of Southern Pike County, Arkansas.* Bulletin 7, Arkansas Geological Survey, State Capitol, Little Rock. Pp. 38. Price 25c. Also, *Arkansas Mining and Mineral Laws,* Bulletin 9, pp. 120, price 75c.; and *Annual Report of State Geologist,* Bulletin 10, pp. 170, price, free.

# NEWS OF THE INDUSTRY

## Justice Department Official Renews Attack on Large Copper, Aluminum, and Tin Producers

*Claims or implies throttling of productive capacity by copper and aluminum producers and price fixing by tin cartel—Senate committee hears Ayer, King, Ickes, Young, and Nelson.*

IN THE OPENING HEARING before a Senate subcommittee on small business, David L. Podell, Special Assistant Attorney General in the Anti-trust Division of the Department of Justice, renewed the attacks on big business in the mining industry which have aroused indignation and contempt among informed members of the metal trades. Podell made the charges on March 30 before Senator Scrugham, of Nevada, chairman of the subcommittee, and Senator C. Douglass Buck, of Delaware, sole other member of the subcommittee. The subcommittee is investigating what it alleges to be the lack of a coordinated policy by the War Production Board, and discrimination against small operators. It also seeks to build up a background for the establishment of a policy of accumulation of large mineral stockpiles by the government.

Podell stated that "The Aluminum Co. of America and foreign cartels have had the world supply of bauxite cornered for two generations before this war and the development of other raw materials for the production of aluminum has been stifled or at least has been permitted to be dormant while the cartels have produced just so much and no more for the world markets."

"The International Tin Committee is a cartel which has controlled the distribution of tin for many years. It allocates the shares among the various producers and fixes the prices at which the product shall be sold."

Podell also strongly inferred that the "big three" domestic copper producers exerted influence to prevent government assistance in the development of small, independent copper properties, and are holding back on some of their sources of potential production.

The universal reaction to these attacks by informed members of the mining business and metal trades was that they were irresponsible, unfair, and damaging to morale.

Frank Ayer and H. O. King, of the copper branch of WPB, testified that the primary factor limiting copper production is lack of manpower.

On the following day Donald Nelson, chairman of WPB, said that if "aged" miners were available for work on new sources of high-cost domestic manganese production their services were more necessary elsewhere, as the two-year stockpile is not being depleted.

Nelson also stated that there was no lack of competition in magnesium production and that the Aluminum Co. of America was fully cooperating in the war production effort.

Howard I. Young, who recently joined WPB as chairman of the Mineral Resources Coordinating Division, denied the insinuation of the committee that he was "just another cook in the kitchen." He offered evidence that full consideration was given to all reasonable possibilities of increasing production of essential minerals.

On April 1 Interior Secretary Ickes again advocated a broad program of government participation in exploration, milling, and reduction, with provisions for the creation and maintenance of large stockpiles and with long-term bonus prices to small operators.

## Terms of Aluminum Contract Disclosed

ON MARCH 24, in a letter to Senator Truman, Secretary of Commerce Jesse Jones publicized the terms of contracts with the Aluminum Co. of Canada, providing for the purchase of 1,370,000,000 lb. of aluminum. The first two contracts were made in May, 1941, and the last contract was executed in February, 1942. The purchase price for approximately 85 percent of the metal is 15c. per pound. That for the remainder, embraced in the first contract, was 17c., which is the price paid by the British and Canadian governments.

Deliveries under the contract have totaled 368,000,000 lb., and repayments have been made totaling $15,919,477 against total advances of $69,500,000. Provision is made in the contracts for terms of cancellation if the full amount of metal specified is not needed.

## National Lead Co. Sells Ilmenite Beach Deposit

THE National Lead Co. has sold all the property and assets of the Ponte Vedra Co., formerly Buckman & Pritchard, according to the annual report to stockholders. The property, consisting of 17 miles of ocean front in Florida, was acquired by the subsidiary in 1922, because of the deposits of ilmenite ore.

## Bureau to Expand Alumina Drilling

IN LATE MARCH President Roosevelt signed an appropriation bill providing $500,000 to enable the U. S. Bureau of Mines to conduct an expanded search for domestic bauxite, alunite, and high-alumina clays, under a joint program of the Bureau and the War Production Board.

## A. S. & R. to Produce Brazilian Nickel

ACCORDING to the annual report of the American Smelting & Refining Co., the company has acquired a 50 percent interest in a nickel property in the State of Goyaz, Brazil. The company has also undertaken to manage the operation under a term contract. Its participation in the property, through Companhia Niquel Tocantins, was welcomed by the Brazilian government, the report stated. Fifty percent of the stock of the Brazilian company is owned by Brazilian individuals and companies of the highest responsibility. Reports by engineers indicate a large tonnage of ore, containing a percentage of nickel that should assure profitable operation. The ore is refractory, but the research department succeeded in working out a process to recover the nickel. The mine contains cobalt, extraction of which will probably begin in advance of the nickel operation.

## Several Lake Superior Operators Sign with CIO

A CONTRACT between the United Steelworkers of America, CIO, has been signed with each of 13 major operators of Lake Superior region iron mines. The contracts name the union as the exclusive bargaining agent for employees engaged in production and maintenance, grant time and a half for overtime over 8 hours a day or 40 hours per week, seniority rights, and provide a basis for settling disputes. The agreement covers only those mines for which the union has been certified as exclusive bargaining agent by the National Labor Relations Board, but will be automatically extended to additional mines of the signatory companies which are thus certified. The contracts do not include wage rates or closed-shop provisions.

The operators involved are Pickands, Mather & Co.; Evergreen Mining Co.; Wheeling Steel Corp.; Cleveland-Cliffs Iron Co.; M. A. Hanna Co.; North Range Mining Co.; Oglebay, Norton & Co.; Republic Steel Corp.; Snyder Mining Co.; Inland Steel Co.; International Harvester Co.; Interstate Iron Co. (J. & L.); and Pittsburgh Coke & Iron Co.

## Metals Reserve Extends Purchasing Period

JESSE JONES, Secretary of Commerce, announced March 30 the extension by Metals Reserve Co. for an additional twelve months from Dec. 31, 1943, to Dec. 31, 1944, of the effective period of the following purchase programs:

1. Domestic mercury, as described in Metals Reserve Co.'s circular of July 9, 1942.

2. Domestic tungsten, as described in Metals Reserve Co.'s circular Nov. 16, 1942.

3. Small lots of domestic chrome and manganese ores and concentrates at purchase depots, as described in Metal Reserve Co.'s circular of Sept. 10, 1942.

4. Small lots of domestic tin and antimony ores and concentrates at purchase depots, as described in Metals Reserve Co.'s circular of Nov. 25, 1942.

The principal modification in the mercury and tungsten programs, as extended, is the provision that the existing prices for mercury and tungsten, respectively, will remain firm to all qualified producers ("new" or "eligible") until Dec. 31, 1943, with Metals Reserve to have the right to terminate these programs after Dec. 31, 1943, by effecting settlements with all qualified producers, upon the terms originally announced under the respective programs as applicable solely to "eligible producers" participating therein.

Under the small-lot purchase programs, deliveries from any one property will not be accepted during the year 1944 in an amount in excess of 1,000 long tons of chrome, manganese, or tin ores and concentrates, or 1,000 short tons of antimony ores and concentrates, except where the seller has made special arrangements with Metals Reserve to accept larger quantities.

## WPB Approves Mill for Montana Manganese

ANNOUNCEMENT has been made that the Facility Review Committee of the War Production Board has approved the construction of a custom mill at Butte, Mont., to treat manganese ores of the Butte and Philipsburg districts. The mill will have a capacity of 400 tons per day and will be operated by the Domestic Manganese Co., which has applied for a $250,000 RFC loan.

## Newfoundland Iron Mine Is Shut Down

OFFICIAL ANNOUNCEMENT has been made by Dominion Steel & Coal Corp. Ltd., of the shutdown of its Wabana iron mine, Bell Island, Newfoundland, due to shipping difficulties. After operating on a reduced scale since November, the uneconomic operation was stopped when weekly production reached the low level of 2,400 tons, compared with the former rate of 5,700 tons. A stockpile of 500,000 tons had been accumulated at the mine, sufficient to supply Dominion's three blast furnaces at Sydney, Nova Scotia, for about six months.

## May Recover Vanadium in New York Magnetite

ANNOUNCEMENT has been made by the Bureau of Mines that the Bureau, in co-operation with the University of Minnesota and the National Lead Co., has worked out a laboratory method of recovering vanadium from the magnetite co-product derived from the milling of titanium ore at the Lake Sanford mine of the National Lead Co., in the Adirondacks.

The magnetite co-product, after sintering, was smelted in a 6-ton experimental blast furnace and an average of 87.3 percent of the vanadium was recovered in the pig iron produced. Vanadium in the pig iron can be recovered by oxidation in a converter. The vanadium content of the magnetite co-product averages 0.35 percent.

The experiments are described in R. I. 3679, "Smelting of Vanadium-Bearing Titaniferous Sinter in an Experimental Blast Furnace," by C. E. Wood, T. L. Joseph, and S. S. Cole. Copies can be obtained from the Bureau of Mines, Washington, D. C.

## Labor Board Orders Two Mine Elections

THE National Labor Relations Board has ordered elections on two mining properties to determine whether the petitioning unions shall be certified as exclusive bargaining agencies for employees under the Wagner Act.

One election, to be held within 30 days of March 13, is to determine if the American Federation of Labor shall represent all surface and underground employees of the 79 Lead Copper Co., of Hayden, Ariz.

The other is to determine if the International Union of Mine, Mill and Smelter Workers, CIO, or the International Hod Carriers, Building and Common Laborers Union of America, A.F. of L., or neither, shall represent the production and maintenance employees of the Lake Crescent mine, located on the Olympia Peninsula and operated by the Sunshine Mining Co., of Kellogg, Idaho. The election is to be held within 30 days of March 23.

## Eagle-Picher Passes Hundred-Year Mark

IN PRESENTING its annual report to stockholders, the Eagle-Picher Lead Co. takes note of its hundredth year of existence.

In discussing lands, leases, and rights acquired in the vicinity of Taxco, State of Guerrero, Mexico, the report says: "The area in which these operations are being conducted has produced very large quantities of gold and silver over a period of centuries. It is highly mineralized and the existence of base metals in paying quantities and of commercial grade was strongly indicated. Exploration to date has confirmed these indications to a degree far exceeding our expectations."

## WPB Halts Development of Chamberlain Nodules

DEVELOPMENT of South Dakota manganese deposits near Chamberlain, called the largest potential source of manganese in the United States, has been halted by WPB with the announcement that "the present manganese situation, when compared with the critical shortages of manpower and equipment, in no way looks serious enough" to continue further expenditures at this time.

In the announcement, WPB said that although the government tests had shown that the manganese-bearing nodules can be successfully separated from the inclosing shale, the problem of separating the manganese from other material in the nodules has not been thoroughly investigated.

"We believe that we know the fundamental metallurgy of such a method," the announcement said, "but it is clear that the type of metallurgical equipment needed for beneficiation would have to be large and even a pilot plant would also have to be relatively large in order to provide significant and reliable results.

"The manganese-bearing shales of the Chamberlain district have long been known as the largest potential source of manganese in the United States, but they are so low-grade and refractory to beneficiation that it has seemed improbable that they would ever come into wide use unless the United States should become almost wholly dependent upon its own resources for manganese.

"At the beginning of the war, this possibility had to be considered, and as a long-range provision against virtually complete isolation from the rest of the world, it was considered desirable to find out how the Chamberlain ores could be used should it ever become necessary."

Experimental mining of the Chamberlain nodules, conducted by the International Minerals & Chemical Corp. under a WPB contract, revealed that the nodules can be mined and separated from the shale by a very simple process of coarse crushing and unsized jigging at an operating cost of $3.50 and a cost, including depreciation, of $5.51 per long ton of nodules recovered.

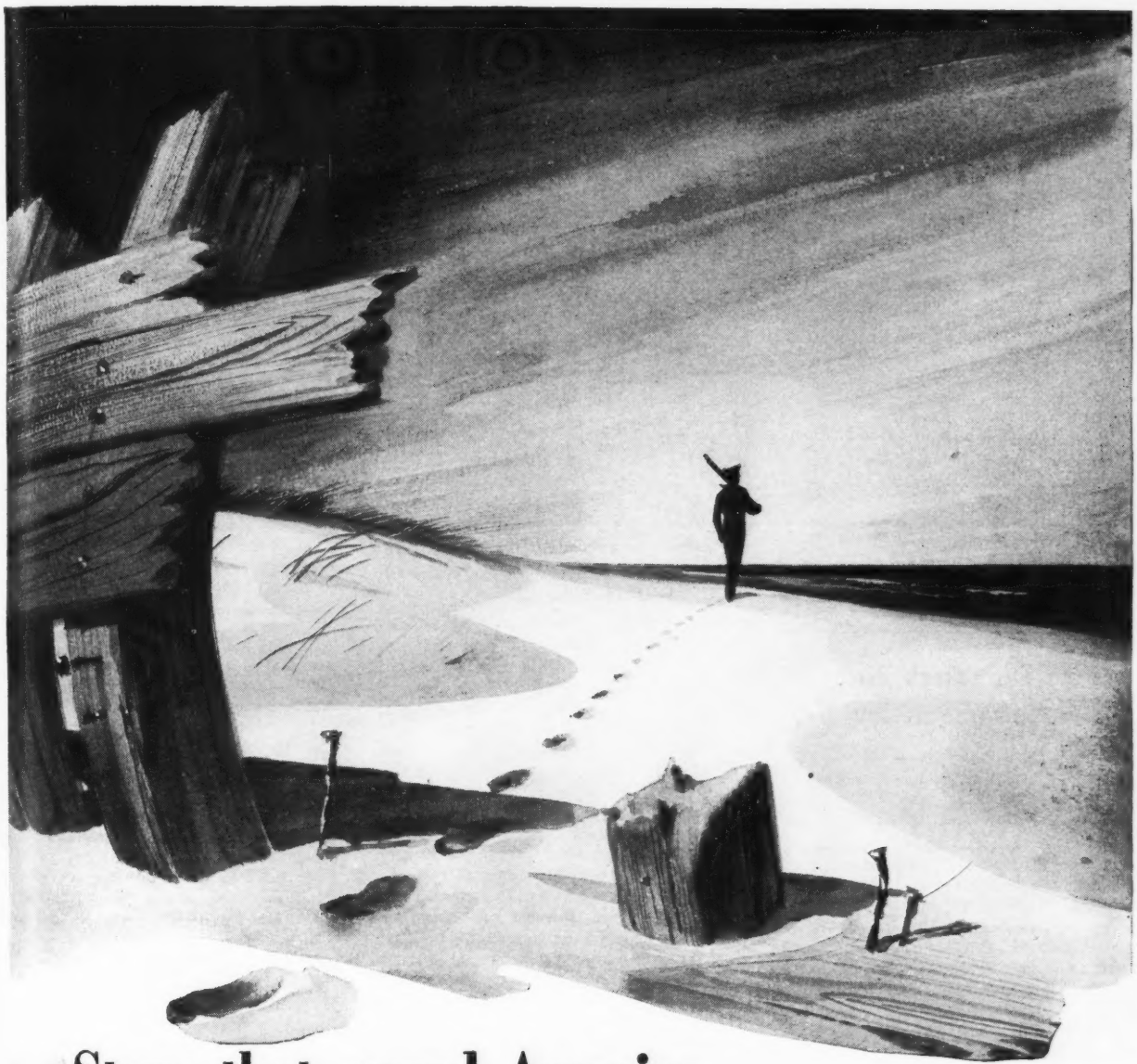
The corporation's report estimated that a plant and equipment necessary to produce 300,000 tons of nodules per year would cost approximately $5,594,000.

The cost given is substantially less than the costs estimated by the U. S. Bureau of Mines, of $8 to $14 per ton, for the explosive-shattering method developed and advocated by the Bureau.

## Zinc Institute Will Forego Convention

TO CONSERVE transportation and war production effort, the American Zinc Institute has decided not to hold the customary annual convention, usually held at St. Louis in the spring of each year.

To carry on necessary business, a meeting of active members, mainly by proxy, will be held in New York.



# Steps that guard America

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Within the nation itself, there's a guardian's job we all can share. By caring for our tools and equipment, we make them last longer . . . and so save vital metals, and time, for greater war production. Storage batteries, for instance, last longer when you follow four simple rules of conservation. Obey them and you hit the Axis. Buy to Last and Save to Win!

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2. Keep the top of the battery and battery container clean and dry at all times. This will assure maximum protection of the inner parts.
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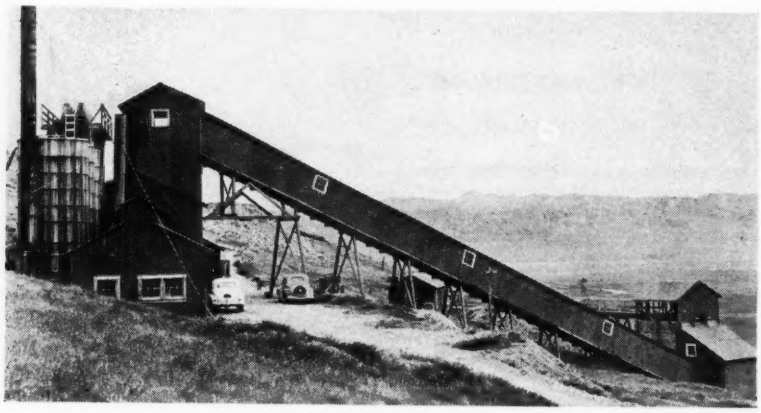
4. Record water additions, voltage, and gravity readings. Don't trust your memory. Write down a complete record of your battery's life history. Compare readings.

If you wish more detailed information, or have a special battery problem, don't hesitate to write to Exide. We want you to get the long-life built into every Exide Battery. Ask for booklet Form 1982.



*Electric-powered plant of Panoche Quicksilver Mines Co., containing a 4x64 gas-fired rotary furnace, San Benito County, Calif. The deposit, discovered in December, 1939, carries mercury as the black sulphide, metacinnabarite*

# CALIFORNIA

## Fire Damages Part of Selby Smelter

*Strategic mineral exploration is active—Two copper properties under development—Mining groups oppose change in State mining bureau*

▶ The east wing of the Selby smelter of the American Smelting & Refining Co., northeast of San Francisco, was destroyed by fire March 13. Considerable damage resulted, but the greater part of the smelter was saved. No estimate of damage is available, but plant officials say figures will be high. The plant is one of the best known Western smelters and is engaged in handling some strategic war metals.

▶ Many gold-mining companies have turned or are turning to operations in the strategic mineral field. However, Lava Cap, at Nevada City, reports that it has an operating crew of 325 men. It is permitted to operate because its base product is needed in the smelting of other metals. Yuba and Natomas are operating several dredges, and small placer operations in Trinity and other counties continue to function with older employees. Trinity County is producing some chrome and manganese ores. Chrome and manganese near Sonora, Tuolumne County, and in the vicinity of Chinese Camp, are engaging the activities of several mining groups. The Pacific Mining Co. is handling custom chrome ore as well as its own ores in the Marsh Flat area.

▶ Consumnes Copper Co. has reopened old workings and made new exploration, reported to be promising. The Newton copper property between Jackson and Ione has been dewatered and diamond drilling is said to have indicated copper ore. Prospecting in chrome and tungsten continues and may be expected to increase in tempo as weather conditions improve.

▶ The California mining division of the State Chamber of Commerce and the Mining Association of the Southwest are opposing the Seawell bill, presented to the California Legislature and proposing to abolish the present California Division of Mines and set up a new department of mines. The mining association favors the abolition of the Bureau of War Minerals Production and any and all political or semi-political bureaus and agencies which seemingly duplicate duties already being discharged either by the California Division of Mines, the U. S. Bureau of Mines, or other long-established agencies. It also, by resolution, called upon the legislature and Governor Warren to refrain from further expenditures of tax money for activities purporting to be of benefit to the mining industry of California, for the duration.

▶ Sonoma Quicksilver Mines, Inc., is treating 135 tons of ore per day at its Mt. Jackson mine, near Guerneville, Sonoma County. Two Gould rotary furnaces are in operation and a second Kue-Ken No. 50 Crusher was installed during January. The main shaft is down 500 ft. and stoping has started on this level. A main pump station was cut and a 100-hp. Byron Jackson pump installed. The mine was then unwatered to the 620-ft. level and at present preparations are being made for the opening of this level. H. D. Tudor, of San Francisco, is president. S. F. Wickham is superintendent, Allen Mowry is mine foreman and H. F. Larsen plant foreman.

▶ Shipment of copper concentrates from the Gray Eagle mine near Happy Camp, operated by Newmont Mining Corp., has commenced and trucks are hauling to Hornbrook, the nearest railway point.

▶ A recent survey of employment in Nevada County gold mines indicates 541 miners are at work, compared to 2,161, a year ago. Idaho Maryland is reported to have 110 men; Empire Star 98 and Lava Cap 325.

# OREGON

## Oregon Gets Bureau of Mines Laboratory

*Bulletin announced on geology of black beach sands—Iron Dyke mine being reopened—Gray Eagle antimony mine to have mill*

▶ Widespread speculations as to the location of the electrometallurgical laboratory announced several months ago by the Bureau of Mines have been laid to rest by formal announcement that the site chosen is at Albany, Oregon. The buildings and grounds of Lewis and Clark College have been acquired for this purpose, for a sum of $134,000. Power will come from Bonneville dam, 100 miles distant.

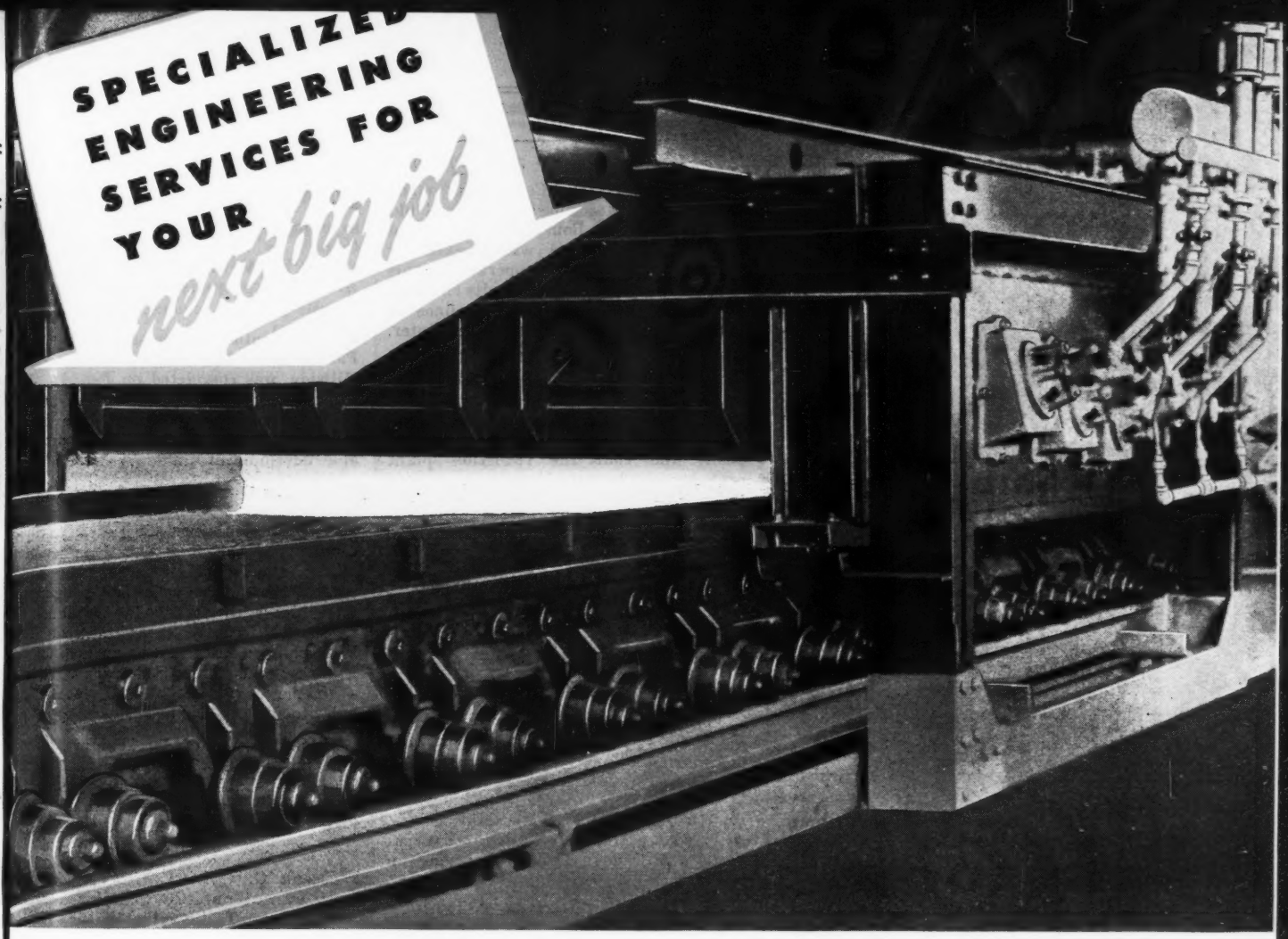
▶ Oregon Department of Geology and Mineral Industries has published a detailed report on the origin of the black sands along the coast in the southwestern part of the State. It is bulletin No. 24, prepared by W. H. Twenhofel, of the University of Wisconsin. These black sands, he says, have been mined for nearly a century and have been studied for almost 50 years. Chromite has renewed interest in the deposits, previously mined only for gold and platinum. The black sands are composed of dark minerals such as magnetite, chromite, and ilmenite which have been concentrated by waves and currents. Deposition is dependent on strength of waves and currents, shoreline configuration, relations of sea level to the land, specific gravity, and dimensions of the sedimentary particles. Dr. Twenhofel believes there may be deposits of black sands beneath the terraces and also beneath the sea.

▶ Anthony Brandenthaler has made shipments to Baker of chrome from properties south of Canyon City. The ore has been investigated by the U. S. Bureau of Mines and U.S.G.S. and assayed by the State Department of Mines analyst. Other shipments were made from float at the Winterville placers, near Whitney, and from a chromite deposit near Unity.

▶ Cooley Butler has had diamond drilling of surface croppings done on the old Iron Dyke mine, a one-time copper producer at Homestead. He is now engaged in active development with a tunnel which has intersected the old shaft. He has penetrated the orebody for some distance beyond the shaft. He expects to secure additional equipment from the Scotia gold mine, in Grass Valley, Calif., which is now closed. If sufficient ore is found, a new mill will be built near the tunnel entrance at Homestead. Fred Kalenborn, geologist, is in charge.

▶ The Gray Eagle mine, at Baker, has shipped a carload of low-grade antimony ore to Midvale, Utah, and a car of high-grade ore to Laredo, Tex. These shipments, totaling 130 tons, were made this year and in 1942. Plans are being made to install a small mill to handle the ore, which is chiefly antimony oxides. Pat O'Brien, of Baker, is the owner.

(*Continued on page 98*)

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## ▶OREGON

(*Continued from page 96*)

▶ The Ellis Mining Co., which made shipments last season from several old gold mines in the Bourne district, closed down when the road was blocked by snow but will resume operations this spring. The ore is wanted for its siliceous flux. Most of the other gold mines of the State were closed during the winter.

▶ Dr. Paul J. Raver, Bonneville power administrator, stated in Portland recently that Seattle industrialists and bankers have organized to open a Pacific Northwest high-alumina clay deposit, and that the reduction plant probably will be built in Oregon.

# ARIZONA

## W.P.B. Establishes Local Mine Division

*New operation in Grand Canyon—May build mill for Kaibab mine—Access road construction summarized*

▶ A newly organized company known as the Havasu Lead & Zinc Mining Co., with headquarters at Goodwin, Yavapai County, will soon begin operations on the W. I. Johnson claims near Supai, in Coconino County. The properties are reached by trail from Hilltop, on the south rim of the Grand Canyon, and were first prospected in 1885. In 1906 Mr. Johnson built a small concentrating unit on the property. In 1921 C. A. Heberlein, of Prescott, did a considerable amount of exploration on the properties. The property has the distinction of having within its boundaries the most beautiful as well as the second largest waterfall in the Grand Canyon. E. B. Stephens and James D. Culbertson will be associated with the new company.

▶ The Arizona Corporation Commission has appealed to the Office of Defense Transportation opposing the proposal to discontinue passenger service on the Bowie-Globe railroad. A commission check of actual passengers carried is in excess of the estimates by railroad officials.

▶ Recent developments at the Kaibab mine, in Coconino County, are of sufficient importance to cause the operators to consider the advisability of building a mill. The company has been making shipments to the smelter at Clarkdale. The property, owned by the United States Metals Co. (Roy S. Gangestad, of Los Angeles, Cal., Vice-president) is being operated by H. G. Snyder, of Salt Lake, under lease.

▶ The Mardun Co., of Los Angeles, has a 75-ton pilot plant in operation on its copper property near The Gap, in Coconino County. The property is north of Cameron, south-east of Lee's Ferry, and approximately 50 miles from the Utah-Arizona boundary. The company is developing a dry method of recovering copper carbonate from sandstone and contemplates the construction of a 1,000-ton plant. The sandstone is relatively soft and is handled by steam shovel after blasting. O. F. Marvin is chief engineer and general manager.

▶ The Davis-Dunkirk mine, in the Hassayampa mining district, Yavapai County, is reported to have been purchased by A. C. Van Hook, of Miami, Ariz. The property has been idle for several years.

▶ The 70-mile transmission line from Parker dam to the Bagdad mine, west of Hillside, was completed on Feb. 15. The expansion program in progress at the mine includes the building of a 2,500-ton flotation plant, as well as considerable development underground.

▶ Lead-zinc-copper ore is being shipped from the U. S. Navy mine, in the Copper Basin mining district, Yavapai County, to the Shattuck-Denn custom mill at the Iron King mine, near Humboldt. The property is being operated under lease by Henry L. Williams, of Prescott. Recently a preliminary RFC loan was granted for the purpose of dewatering the mine and repairing the shaft between the 350-450 levels, rehabilitating drifts, and samplings.

▶ N. S. Oberon, of Wickenburg, is reopening the old Camp B mine, in the Black Hills district of Yavapai county, having been granted a preliminary RFC loan. The property has been idle several years.

▶ Joseph G. O'Brien, of Chloride, has been granted an RFC loan for development at the Tintic mine in the Wallapai district, Mohave County. The property has produced some lead-silver-gold ores.

▶ Thomas J. Long, of Globe, is producing about twelve tons of manganese ore daily from the Black Oxide and Boston claims in the Copper Hill district near Globe.

▶ Nine roads, totaling 141.5 miles and giving access to sources of copper, vanadium, manganese, lead, zinc, asbestos, and timber, have been built in Arizona under the plan to speed up production of critical war minerals, according to an announcement by Henry S. Wright, district manager of the War Production Board at Phoenix.

▶ Designed to speed the war effort through assistance to miners producing essential minerals, a mines division of the WPB has been established in the district WPB office in Phoenix. A. C. Nebeker, of Prescott, recently associated with the Arizona Department of Mineral Resources, has been placed in charge of the division. Mr. Nebeker is a graduate of the engineering school of Utah State College and studied geology and engineering at Columbia University. Previously the coordinator of mines in Arizona for WPB has been C. M. Martin, assisted by Miss Pauline Gentry, volunteer workers, who have carried on the work at much personal sacrifice.

▶ Claire Allen and Ike Bond, lessees of the Evergreen claim in the Camp Wood district of Yavapai County, are making shipments of high-grade tungsten to the Fernstrom plant at Tucson.

# ALASKA

## Protest Land Withdrawal Near Alcan Highway

*Hirst-Chicagof mine to resume operation—Will develop complex ore on Prince of Wales Island—Sleitmut maps available from Survey*

▶A. J. Dimond, Delegate to Congress from Alaska, and Congressman Compton I. White, of Idaho, have sent a protest to Washington, D. C., against executive order No. 9146 withdrawing from mineral entry 8,320,000 acres of Alaska land along the new Alaska highway. The lands withdrawn are 20 miles on each side of that thoroughfare and are in the Tanana River and the Copper River-Mentasta-Tok River sections. They declare that mining men were assured that this new highway would open new mining fields and that this order closes what would have been good prospecting areas. Mrs. Maude Boyle, chief clerk of the U. S. land office at Fairbanks, says the purpose of the withdrawal is to classify the land for mining, grazing, agriculture, and forest purposes.

▶Paul M. Sorensen, general manager of the Hirst-Chicagof mine, in the Juneau district, says operations will soon be resumed. He says reopening the mine is made possible by a changed ruling of the War Production Board which closed the property last fall. Operations will be on a one-shift basis, as they were last year. Seventeen men will be employed, some of whom have already returned to the property.

▶Funds of Treadwell Yukon Corp., amounting to 10c. or more a share, will be distributed when the exchange control agreement between Canada and the United States is terminated. Possessions of the corporation include the Wernecke silver-lead property, in the Yukon, and the Tybo mine, in Nevada. For many years the Yukon property was managed by Livingston Wernecke until he lost his life in an airplane crash. Philip R. Bradley, of San Francisco, is vice-president of the corporation.

▶J. G. Galvin, of Seattle, has acquired the Westlake claims near Dora Bay, on Prince of Wales Island, one of the Alexandria group, in southeastern Alaska. He obtains the property from B. Van Zandt, H. M. Smith, and the estate of Alex Rouge, all of Ketchikan. With modern equipment he believes he will be more successful in extracting the gold, silver, lead, and zinc values. He also owns the Sam Tucker mercury mine, near Nome, and a chrome prospect between Wrangell and Ketchikan.

▶William Morin, of Seattle, one of three owners of the Forsgren Dredging Co., says it probably will be impossible to operate the property this year, because of government regulations. The property consists of gold-bearing sands along the Amnachuck River near Deering, 60 miles north of Nome. His two partners are Richard Forsgren and Harry Forsgren. On his way out last fall Morin was stranded in Nome 47 days awaiting passage.

(*Continued on page* 100)


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The Amsco Missabe Dipper was an acknowledged advance over any previously built and it is still popular with operators in coal stripping, harbor dredging and in the Iron Range from which it got its name. This dipper's body has a front and back casting securely riveted together through overlapping sections. Bail brackets are on the front casting and are placed at an angle conforming to the line of bail pull so that shearing of rivets and pulling apart of front and back are virtually impossible.

In 1930, Amsco developed the first true renewable lip dipper, with the patented U-bolt fastening, interlocking joint design. This allowed lips to be changed in minutes instead of hours.

Since 1930, the Amsco lip design has evolved from the original blunt box shape to the present extended, rounded contour, sharp-edged lip with fanned teeth. The lips are carried further up the sides of the back casting, shortening the U-bolt and enabling teeth and lips to withstand heavier stresses. Reduced overall weight, smoother interior and a double taper outwardly, from top to door, assure faster and maximum loading as well as faster, cleaner dumping.

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## ▶ALASKA

(*Continued from page* 99)

▶ Men of the U. S. Geological Survey have examined quicksilver-antimony deposits in the Sleitmut area, in the Georgetown district in the southwestern part of the Territory. Detail maps have been prepared showing surface exposures and their relations to underground workings. Photostat copies are available from the survey.

▶ B. D. Stewart, Territorial Commissioner of Mines, has announced that Eskil Anderson, graduate in mining and geology at the University of Alaska, has been appointed engineer assayer for the Territorial department. He will study strategic minerals, examine prospects, and make assays of ore for miners on the Seward Peninsula. He will make a special study of tin, tungsten, and antimony. He is also conducting short mining courses at Nome.

## WASHINGTON

### Pend Oreille Accepts WLB Wage Increase

***To build co-operative mill near Northport —Drilling continues in Metaline district— New Pidgeon-process magnesium plant to start***

▶ Northport District Mining and Milling Cooperative has been organized by mine and prospect owners in the Northport-Leadpoint area of Stevens County. The object is the construction of a custom mill. It is estimated that a sufficient tonnage of lead-zinc ores is available to supply a 200-ton plant. It is a P. U. D. enterprise, incorporated with the following directors: R. R. Boucher, Colville, president; Fred Nudell, Northport, vice president; Carl Sauvola, Northport, secretary-treasury, and John Colby and P. B. Darlington, Northport; Emmitt Hubbard, Cedar Creek, and Fred R. Jameison, Boundary, directors.

▶ The U. S. Bureau of Mines (erroneously reported last month as U. S. Geological Survey) is continuing its drilling exploration for new zinc-lead orebodies in the Metaline district. The two major corporations which are mining in that district—to wit, Pend Oreille Mines & Metals Co., and American Zinc, Lead & Smelting Co—are also diamond drilling underground in search of additional orebodies. Some of this exploration work is said to be meeting with success.

▶ Pend Oreille Mines & Metals Co. has purchased from Charles I. Barker, of Newport, receiver for Pend Oreille Premier Mining Co., four claims near Metaline Falls on the east bank of the Pend Oreille River. Pend Oreille Mines & Metals Co. has installed a large electric hoist made by Coeur d'Alene Hardware & Foundry Co., at Wallace. It is a 150-hp. equipment, weighing 14,000 lb., with a hoisting capacity of 10,000 lb. at a rope speed of 120 f.p.m. from a depth of about 2,700 ft.

▶Jens Jensen, secretary of Pend Oreille Mines & Metals Co., says that the corporation is accepting the order of the WLB and will pay its 150 employees $1 a day increase in wages. The order is retroactive to May 16, 1942. D. I. Hayes, manager of American Zinc, Lead & Smelting Co., says he has made application for authority to grant a similar wage increase for men employed in Metaline Mining & Leasing Co. and in Grandview Mines Co.

▶Conrad Wolfle, of Spokane, has acquired a manganese property near Wauconda, in eastern Okanogan County. It was discovered in 1900 by William B. Moore. It is said the orebody is 40 ft. wide and has been traced 1,000 linear feet. Wolfle takes the property on a ten-year royalty contract. He expects to sink a shaft as his first work.

▶W. A. Broughton, of the State Department of Conservation and Development, is making a thorough examination of the magnetic iron deposits on Buckhorn Mountain, in Okanogan County. This property is producing several carloads of ore a day and is shipping to the Northwest Magnesite Co. at Chewelah. Analyses are said to show 62.28 to 70.15 percent iron. The report estimates a possible volume of 4,826,000 tons of ore.

▶A. E. Drucker, of Pullman, director of the State Electrometallurgical Laboratories, has issued a comprehensive bulletin on the alumina content of bauxite, alkaline processes of recovering alumina, and kindred subjects, including aluminum carbide and the refining of aluminum.

▶Production of metallic magnesium by the Electrometallurgical Co. at its Washington plant is expected to get under way soon. This will be the first production of this material on a commercial scale anywhere in the Pacific Northwest. It is expected that the payroll of this plant and the nearby ferro-silicon plant, which is also due to start soon, will amount to 1,000 men and women. Dolomite and silica will come from eastern Washington and the iron from Utah.

▶Howe Sound Co. paid a 75c. quarterly dividend, amounting to $371,693, March 31. This is practically the same rate as it paid last year. The property is above Lake Chelan, in central Washington. The mine has been a heavy copper producer for several years and has produced some gold. At the behest of the government the company is now producing zinc, although it is not certain that there will be a profit in it.

▶The Washington State Department of Geology has made a thorough examination of the magnesite deposit at the Turk mine, in southwestern Stevens County. It reports that most of the magnesite occurs stratigraphically below a highly siliceous zone of dolomite. About 5,000 ft. of drilling was done in 19 holes which delimited two bodies of magnesite about 500 ft. apart. The north body is about 230x280 ft. in area and about 280 ft. deep. The south body is 140 ft. square and 220 ft. thick. It is estimated that the two bodies contain about 500,000 tons of metallic magnesium.

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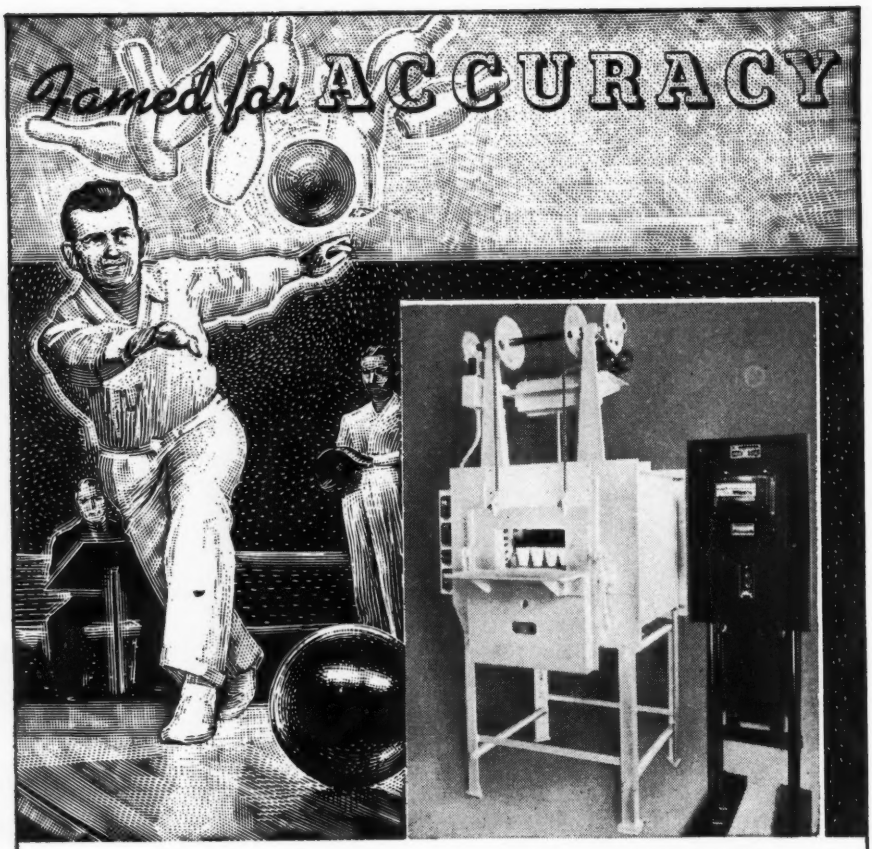


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## NEVADA

### New Scheelite Mill Under Construction

*May shorten haul for magnesium ore— Revival of Comstock activity under way— Manhattan dredge may resume*

▶ Construction of a 250-ton scheelite tailing flotation plant is in progress near the 100-ton concentrator of the Rare Metals Corp. at Toulon, on the Southern Pacific main line in Pershing County. Rare Metals is a subsidiary of the Nevada-Massachusetts Co., until recently the largest United States producer of tungsten. Ott F. Heiser, of Mill City, is manager, and John Heiser superintendent. Tailing treatment will be similar in practice to that at the 1,000-ton tailing plant at the Nevada-Massachusetts mines near Mill City. Western-Knapp Engineering Co., of San Francisco, is building the mill under contract.

▶ With completion of a road 22 miles south from Golconda to the Black Diablo manganese mine, in Pumpernickel Valley, northern Pershing County, the Golconda Mining Co., Hollis E. Chatwin, of Golconda, manager, has secured delivery of three 10-ton trucks and has increased substantially the volume of ore shipments to the furnace plant of the Columbia Steel Corp., subsidiary of U. S. Steel, at Ironton, Utah.

▶ Essential priority rating having been restored, the Central Comstock Mines Corp., under direction of A. E. Vandercook, with office at Virginia City, is proceeding with construction of the first 100-ton unit of a cyanide mill on the side of the flotation mill operated some years ago by the Arizona Comstock Corp. The company, said to be financed by a small group of leaders in the motion-picture industry, last year acquired the "middle" group of one-time bonanza mines on the Comstock lode, including the Savage, Hale & Norcross, Chollar, and Potosi. The Hale & Norcross tunnel, main outlet of the group, has been reconditioned to the "transfer" shaft, a new electric hoist installed at the shaft station, and the shaft retimbered to the 830-ft. level. A large tonnage of mill-grade ore is available underground and surface dumps contain ore sampling from $2.50 to $8 per ton in volume reputed to aggregate several million tons.

▶ In its 1942 annual report the Goldfield Consolidated Mines Co. describes a tungsten operation it is conducting on the Yankee claims near Rawhide, Mineral County, where camp facilities and mining equipment have been provided. The Dixie gold property, in Churchill County, was closed down and equipment removed. A small quantity of siliceous ore was shipped from old dumps at Goldfield and Aurora mines. Livengood Placers, Inc., 17 percent owned, was unable to complete its water system and remained inactive. The National Metals Co. plant at San Francisco, purchased by Goldfield Consolidated, is producing powdered magnesium for war requirements.

▶ Prospect drilling on the Castle Rock cinnabar property, near Gilbert, northern Esmeralda County, has been undertaken by a newly formed syndicate titled the Strategic Minerals, Inc., composed of experienced miners of the region and headed by Fred O. Gilbert, eldest of the brothers who discovered and made substantial gold production from the Gilbert district. With present headquarters at Luning, Gilbert is in direct charge, and has been at San Francisco to purchase a diamond drill and other equipment.

▶ Plans to extend the Tonopah & Goldfield railroad south from the present Goldfield terminus to Las Vegas are reported to have made favorable progress. Controlling stock interest in the railroad company was sold in October by the Tonopah Mining Co., of Nevada to the Dulien Steel Products, Inc., and President Louis Dulien, of Seattle, has been in Washington for several weeks to confer with federal agencies concerning the project. Capt. Walter Rowson, of Reno, attorney for the Dulien interests, said the Defense Plant Corp. had agreed that necessary steel for the road extension would be diverted, provided federal engineers held it to be of strategic value. The proposed road would cut some 800 miles from the present route over which magnesium oxide is transported from the Gabbs Valley calcining plant to the main magnesium metal plant of the Basic Magnesium, Inc., in southern Nevada, now operated by the Anaconda Copper Mining Co.

▶ Production of mercury was maintained in March at the rate of three flasks per day from the rotary furnace plant at the Nevada Quicksilver property of the Harold's Club Mining Co., for which Ervin J. Young, of Reno, is managing engineer. At the same company's Last Chance zinc-lead property, near the Greenan-Kerr tin mine, also in Pershing County, further sinking of the main shaft is in progress and equipment for a flotation mill is on the ground. In the Potosi district of Humboldt County, the company has delivered a compressor and other equipment at its Valley View tungsten claims, where Alex Ranson, superintendent, a veteran manager of tungsten mines, is delivering scheelite by truck to the tungsten custom plant of the Getchell Mine, Inc., 5 miles to the north.

▶ The Manhattan Gold Dredging Co., which operated for several years the only bucket-line dredge in Nevada, has applied to the WPB for permission to resume operating, having closed down in December with third rank among gold producers of the State. The company is partly owned by the Natomas company, of California, which operates the 12,000-cu.yd. dredge. John L. James has charge at Manhattan.

▶ One-half of the metal units are producing, half of the tunnel and rotary kilns are in operation, and the chlorine plant has passed the 50-percent production point at the magnesium metal plant of the Anaconda-operated Basic Magnesium, Inc., designed to produce 12,000,000 lb. annually of the vital light metal.

▶ In the federal district court Judge Frank H. Norcross has decided in favor of the defendant Summit King Mines, Inc., wholly-owned subsidiary of Bralorne Mines, Ltd., in a suit instituted by 11 mill employes to recover approximately $9,000 in wages for their lunch hours between January 1940 and April 1942. Asserting they had spent their lunch periods in the mill, plaintiffs insisted they were therefore "on call" and were entitled to pay. Summit King Mines, Ltd., Percy G. Dobson, of Fallon, manager, operated until the WPB closing order the Dan Tucker gold-silver mine and 70-ton cyanide mill near Sand Springs, in Churchill County.

▶ Engineers of the U. S. Bureau of Mines, acting for the Metals Reserve Co., have been investigating factors in connection with the proposed establishment of an ore-purchasing depot and custom milling operation at the lead-silver mine and 150-ton selective-flotation mill of the West Coast Mines, Inc., at Barrett Springs, 10 miles west of Winnemucca, in Humboldt County. The company, of which W. J. Kamenzind, of Sacramento, is president, had prepared last year to install sink-float equipment but was forced to suspend both mining and milling by shortage of labor.

▶ The RFC has granted a $15,000 development loan to J. W. Gainey, of Tuscarora, and Walter B. Lenhart on the Berry Creek mercury property near Tuscarora. Gainey will manage the enterprise and Lenhart will act as consulting engineer.

# IDAHO

## Zinc Fuming Plant Near Completion

*Comeback mine has rich ore—Federal reopening old Frosci mine—Sidney mill nearly ready to operate*

▶ The new zinc fuming plant, now nearing completion at the Bunker Hill & Sullivan property at Kellogg, will handle approximately 400 tons of slag per day taken from the huge slag piles built up around the smelter over the past 27 years. That portion of the slag dump which can be economically re-treated for zinc recovery contains about 1,000,000 tons, with an average zinc content of 10 percent, or a total of 100,000 tons of zinc, according to P. C. Fedderson, general smelter superintendent.

▶ Hecla Mining Co., operating the Hecla mine, at Burke, and joint owner with the Bunker Hill & Sullivan in the operations of the Star mine, at Burke, and the electrolytic zinc smelter at Kellogg, has announced taking a lease and bond on a zinc property at Honritos, Calif., known as the Blue Moon and owned by Red Cloud Mines, Inc. President L. E. Hanley of the Hecla company states that production will start at once. Ralph Neyman, mine superintendent at the Hecla, is in temporary charge of operations, and Robert H. Dunn, of the Hecla engineering staff,


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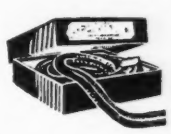

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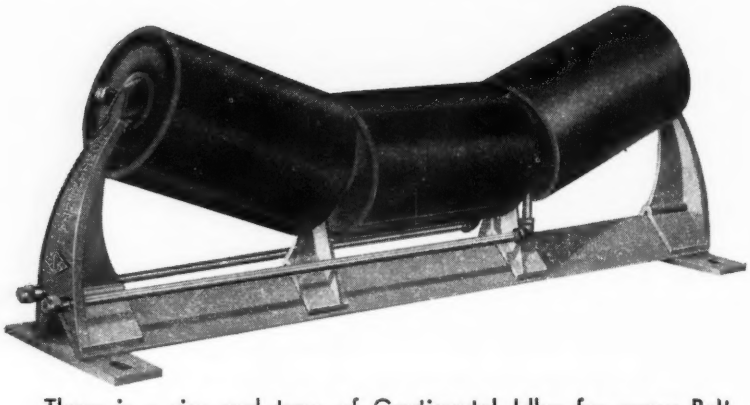

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## ▶IDAHO

(*Continued from page* 103)

will be resident manager at the property. The company has leased an old gold mill in the vicinity of the Blue Moon and will remodel this plant into a modern flotation mill.

▶ The Comeback mine, at Pioneersville, Boise County, is attracting considerable attention because of high-grade ore shipments. Frank Pompia, one of the operators, is reported to have recently opened a shoot of ore in the mine assaying approximately 125 oz. in silver, 9 oz. gold, and 7 percent zinc. The property has a production record of $500,000 since discovery in 1925.

▶ Idaho is the second largest phosphate producing state in the union, according to the U. S. Bureau of Mines. Montana leads with 150,402 tons; Idaho follows with 114,079 tons in the past year. Most of the phosphate is handled by Anaconda Co. at its property near Conda, in southeastern Idaho. A new operator, known as the Teton Phosphate Co., Boise, with holdings near Montpelier, is attracting attention. A huge development enterprise is under way at this place on government account, preparing phosphate beds containing a high percentage of vanadium for production.

▶ The Coeur d'Alene Mines Corp., operating a silver-copper-antimony property near Wallace, made a net profit the past year of $111,370. Federal and State taxes totaled $151,439. Ore tonnage mined in 1942 totaled 122,301 tons and metal recovery was 1,586,460 oz. silver, 3,132,398 lb. copper, and 1,839,936 lb. of antimony.

▶ Federal Mining & Smelting Co. reports net earnings of $1,301,616 for 1942 after deducting federal taxes but before deducting depreciation and depletion, according to Francis H. Brownell, president. The company operates the Morning and Page mines, in the Coeur d'Alenes, and is now unwatering the old Frosci mine, in Burke Canyon, idle since 1916. The shaft has been unwatered to the 1,000 level. Stoping operations will soon be under way on two levels.

▶ The new 50-ton mill at the property of Sidney Mining Co., on Pine Creek, in the Coeur d'Alene district, will be in operation within the next 30 days, according to William Beaudry, superintendent. It is a modern flotation plant to treat the lead-zinc ores of the mine. A new orebody on the lower levels has recently been opened, manager Beaudry reports, that averages 12 to 17 ft. wide, with the ore showing an average of 8 percent lead and 14 percent zinc. During recent months the mine has sent 1,600 tons of ore to the Little Pittsburgh mill, near the Sidney. The U. S. Forest Service has recently completed a road to the property.

▶ The Camas Trust, operating a property 12 miles west of Hailey, in the Wood Mountain area, is reported to have purchased considerable equipment from the Minnie Moon mine and will increase its output from 30 to 150 tons per day. The plant is being electrified.

Main production is a high-grade siliceous ore now in demand by smelters.

▶Clay beds in the vicinity of Coeur d' Alene city are being examined for alumina content and may become a source of alumina for the rapidly growing aluminum industry in the Spokane Valley, adjacent to the deposits. Several other large areas in the Northwest have been examined and reported favorable for this purpose.

▶Fluorite, a much-needed mineral, is to be mined near Salmon, according to Arthur Chambers, of that city, who has taken a ten-year lease on a property near Camas Creek. He is said to have a government contract for 10,000 tons of fluorite a year.

## MONTANA

### Bureau to Investigate Running Wolf Iron

*Project is part of proposed sponge-iron development—Old Emma lead-zinc mine reopened — Phosphate rock production shows increase*

▶The U. S. Bureau of Mines plans to investigate the Running Wolf iron ore deposits in Judith Basin County, according to word received in Montana from Senator Burton K. Wheeler. A drilling program to begin this spring is proposed. The work is to be a part of the Bureau's sponge-iron program. The Running Wolf deposits have twice been examined by geologists of the U. S. Geological Survey, and have been involved in a number of controversies over the feasibility of establishing an iron and steel industry in Montana. The recent sponge-iron flurry has revived interest in them.

▶Mrs. William S. Gage, of Twin Bridges, has pumped out the old Emma mine, in the Rochester district of Madison County. The mine workings are now being rehabilitated and production from the mine is expected soon. Small bodies of high-grade lead-zinc ore were found already exposed in the bottom levels of the mine. The ore will be shipped direct to a smelter. Initial work at the Emma mine is being financed by a development loan of $5,000 from RFC.

▶Production of phosphate rock from Montana deposits was 150,400 short tons in 1942. This is an increase of 45,000 tons over 1941 production. The bulk of the Montana phosphate production is contributed by Montana Phosphate Products Co., Garrison, Mont., and Trail, B. C.; Mineral Hill Mining Co., Butte; and L. H. Skeels, Maxville. Montana Phosphate Products Co. is the largest producer. This company operates the Anderson mine, near Garrison, in Powell County. Most of its product is shipped to Consolidated Mining & Smelting Co., Trail, B. C. Mineral Hill Mining Co. operates a mine near Avon, in Powell County, and L. H. Skeels produced a relatively small tonnage of phosphate rock from deposits near Maxville. All Montana phosphate rock comes from the Phosphoria formation of Permian age.


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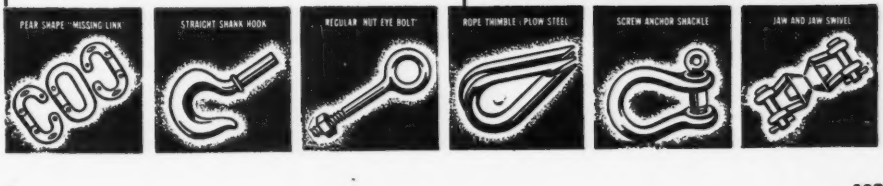

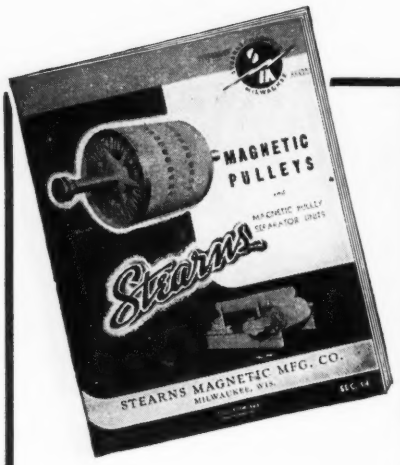


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# COLORADO

## Association to Push Leadville Tunnel

*Jamestown operation will handle fluorspar —Argo mine deaths are laid to negligence —Nickel reported in Routt County*

▶ E. P. Moe, in charge of operations for the Mineral Chief mine, states that operations are progressing rapidly and that he will soon be ready to ship ore. This property, operated by L. R. Saunders and associates, has the main level cleaned out for a distance of nearly 800 ft., and work has been started on the sixth level. The property is at Georgetown.

▶ Harry Williamson & Son have changed their mill at Jamestown over to treating fluorspar ores, and they are now shipping fluorspar regularly from their Emmett mine, 280 ft. deep, and the Brown mine, nearly 300 ft. deep. They have some 40 men on the payroll, and expect to start mining fluorspar ore from the Bluejay, and both fluorspar and lead from the Argo, during 1943. A special ramp was constructed by the Colorado & Southern to take care of the Williamson operations at Boulder, in 1942, at the time the mill was rebuilt.

▶ The Lake County Mining Association, with Edward Dickerman as president, has been formed to aid in obtaining government help in constructing a deep drainage tunnel to unwater the Leadville district. The bore as urged by the association would be driven from the Arkansas River bed 3 miles south of Malta, 42,000 ft. to the Penrose shaft. This project would cost nearly three million dollars, and it is believed it would unwater the largest section of the district and permit the mining of large bodies of complex sulphide ores, as well as carbonates that can be used. The U. S. Geological Survey project of determining the most feasible possible route for such a tunnel was resumed during the summer months, with Dr. Swartz in charge and assisted by F. C. Farnham. Seismic and electrical resistivity apparatus were used to study the type of rock in each area. The experiments were carried on from the Crystal Lakes area toward the south end of the city, traversing Iowa and Thompson gulches and the mesa south of Leadville. This project has been presented to the WPB at Washington.

▶ Since the gold mine closing order became effective, a change-over to use gold milling equipment to treat strategic war metals was made by the Slide Mines, Inc., which property was one of the largest gold-treating mills in Colorado. The property, near Goldhill, in Lefthand Canyon, anticipated the temporary stoppage of mining and milling of gold ores early in 1942, and began unwatering and retimbering leased tungsten properties on the Rogers tract. Much of the equipment was transferred from the gold properties to the tungsten mines, and some of these changes were made nearly 60 days ahead of the gold restraining order in October. Mines 1, 2 3, 4, and 5 of the Rogers tract are being worked, and the ores are being milled by the Boulder Tungsten Mills.

▶ Walter Frank, of Elk Creek; C. L. Davis, of Delta; and Clarence Spalding, of Montrose, owners of a mica mine near Cimarron, are now building a blacksmith shop, sawmill, and bunkhouse, and the grazing service has projected a road from Highway 50 to the mine.

▶ The bodies of the four men killed in the Argo tunnel disaster at Idaho Springs have been recovered. At the inquest it was reported that the primary cause of the deaths was negligence in not enforcing the driving of pilot holes where proximity of underground water in adjacent mine workings was known.

▶ The Defender and Blue Eagle mines, at Silver Cliff, are being operated under bond and lease by W. J. Kettle, H. R. Henning, and L. Schoolfield. A shipment

of silver-lead ore was trucked from the property to the smelter at Leadville.

▶Leasers Tom Walsh & Son have encountered good tungsten ore in the Sunday mine, on Beaver Creek south of Nederland. The 150-ft. lift was extended to 200 ft. At 150 ft. Walsh found a large body of tungsten ore, and he has been drifting to pick it up. The mine, leased from George W. Cowdery, of Boulder, has six men working in the mine and mill.

▶During 1942, the Alma-Lincoln, at Idaho Springs, enlarged its holdings by taking over the Cardigan and Metropolitan groups, comprising 21 claims. This property has been a consistent producer for a number of years, and has been quite successful with its tailings disposal arrangement along Clear Creek. C. M. Lyons is president and general manager of the 90-ton mill and operations.

▶Robert Sterling, Western manager of the Vanadium Corp. of America, reopened the Conger tungsten mine, near Nederland, in 1938, and has since developed it into the company's main producer in this district. In addition to working new orebodies, a heavy development program is under way on the Conger, and the Spider Leg, to the north, and the Grayback, to the south, are both idle.

▶Reports of nickel discoveries in Routt County are being checked, and investigations will be made in the spring. Old properties have been reopened by Milbank Franz near Clark, 20 miles north of Steamboat Springs, which yield high-grade zinc-lead ore. Chutes, bins, and road have been constructed, compressor and drills installed, and production will begin this spring.

▶Victory Metals, Ltd., recently started work on the Bullion property, just outside of Central City. The company is now reopening the shaft to the bottom of the shallow workings. Sinking operations will start when the hoist and compressor have been installed. The shaft on Bullion No. 2 will be sunk deeper, as it has produced some good zinc-lead ore. With the new operations Victory Metals expects to be a good war producer of zinc. William O. Ziege, Clifford I. Parsons, and Roy G. Olson are the officers of the new syndicate.

▶Emperius Mining Co., which controls all operations in the Creede district, operated at full capacity in 1942, and again silver production exceeded the million-ounce mark. Also, nearly 1,500 tons of lead was produced. Lead-copper recovery equipment was added to the modern flotation mill. The company, which owns its own power plant, cut the manpower from 160 to 120 men. The mining and milling of 40,000 tons of ore crimped the ore reserves, as the bulk of mine development work was badly hampered for lack of manpower.

▶The New Cashin Mines Co., at Paradox, has been granted a $5,000 preliminary development loan, to unwater its copper-lead property on La Sal Creek. Test shipments have already been made. Officers of the company are: J. W. Bleazard, president; O. C. Hansen, manager and secretary-treasurer; William Ward, superintendent; and George H. Ryan, consulting engineer.

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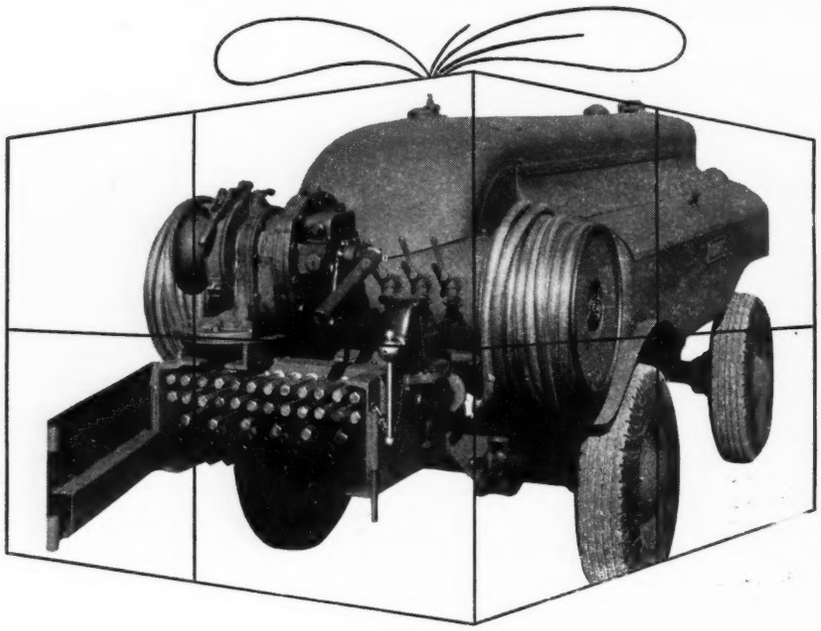

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# UTAH

## Legislature Makes Block Leasing Feasible

*Mining of iron ore begun in Iron Mountain area—New Park starts in South Mountain area—Chief Consolidated to mine deeper levels*

▶ Action by the Utah Legislature will make it possible to increase the production of vital war metals appreciably. Approximately 10,000 tons of ore a month more can be mined now through the passage of laws clarifying the status of a leaser. The new legislation will permit the resumption of block leasing in metal mines by defining a lessee who meets certain conditions as an independent contractor. Previously under a State Supreme Court decision, a lessee has had the status of an employee and mining companies have been required to provide social security coverage and assume the risks of employers. The result has been to reduce the production of metals through the leasing system almost to nothing.

▶ Directors of the Tintic Standard Mining Co. have declared a dividend of 2½c. a share, payable March 31, increasing the grand total of disbursements to $18,636,557.05.

▶ Mining of iron began in late March from the claims of the Colorado Fuel & Iron Co. in the Iron Mountain area west of Cedar City. From 25,000 to 40,000 tons monthly will be mined and shipped to Minequa, Colo., for processing, along with ore from Wyoming. A low phosphorus and a high iron content make the Utah ore desirable for smelting purposes.

▶ In the Big Cottonwood district, 25 miles southeast of Salt Lake City, the American Metals Co. is driving two adits in the vicinity of the Cardiff mine. The RFC has granted Dr. James E. Dowd, of Salt Lake City, $14,000 to equip and develop the Guy manganese holdings in Millard County. Fife Brothers, of Cedar City, have been loaned $15,000 to develop the New Arrowhead claims in the Indian Peak district, Iron County, 28 miles from Lund. The Wah Wah Mining Co. has started developments at its Milford County property, financed by a $20,000 RFC mine development loan.

▶ A body of ore carrying high values in copper has been opened up in the Big Cottonwood district by the Kentucky-Utah Mining Co. One shipment carried $22 per gross ton.

▶ Operations have been started by the New Park Mining Co. at its newly acquired lease, the Showers and Bowers properties, near Diamond City, in the South Tintic district. Buildings, a new headframe, a compressor, and an electric hoist have been installed under the direction of W. H. H. Cranmer, president of the company, at Keetley. Unwatering of the workings from the 400 to the 600 level has preceded the exploitation of the lead-zinc ore abandoned in the early days because of the zinc penalty.

▶Production of the Chief Consolidated Mining Co. is to be increased rapidly to 5,000 tons a month from the quartz zones below the 1,800 level of the main mine at Eureka. Water is now being pumped from below the 2,000-ft. level. As rapidly as it recedes, mining will follow in the five winzes sunk from the 1,800 level. Cecil A. Fitch is president and general manager of the Chief Consolidated Mining Co.

▶Operation of a new mill for the treatment of vanadium ore began at Blanding on March 12, according to the announcement of Fred A. Brinker, treasurer and engineer of the Blanding Mines Co. The mill is processing ore from mines leased by the company in the Cottonwood district, 14 miles southwest of Blanding.

## Utah Offers Fellowships for Mining Research

THE Engineering Experiment Station of the University of Utah is offering several research fellowships for the school year 1943-44, each carrying a stipend of $600. Fellowship men are exempted from the non-residence fee, but are required to pay other university fees, which average about $100 for the school year.

The work of the station involves problems dealing with the mineral industries and resources of the state. Fields in which research work is conducted include mine ventilation, ore dressing microscopy, flotation fundamentals, geology and mineralogy of mineral resources, pyrometallurgy and hydrometallurgy, etc. The work will be carried on mostly in the recently completed Experiment Station building.

Research fellowships are open to college graduates who have had the proper training in mining, metallurgy, chemistry, geology, or engineering. Fellows will report at the University on or before Sept. 1, 1943. They will register as students in the University and become candidates for the degree of master of science. They can ordinarily complete the requirements for the degree in one school year, but additional time may be required if deficiencies exist in undergraduate training. Applications should be submitted as soon as possible, and not later than May 15, 1943.

## Utah Smelterman Awarded WPB Honorable Mention

NICK BENOS, in the roaster department of the American Smelting & Refining Co. smelter at Garfield, Utah, has received an award of honorable mention from the War Production Drive headquarters of the War Production Board. Such awards are made in recognition of suggestions that increase or improve production. The suggestion of Mr. Benos was that a hole be cut in the outer rim of the top hearth of a multiple-hearth furnace to prevent overloading of the rabble arms by wet ore.

Only civilians whose production suggestions are certified to the WPB by labor-management committees are eligible for awards.


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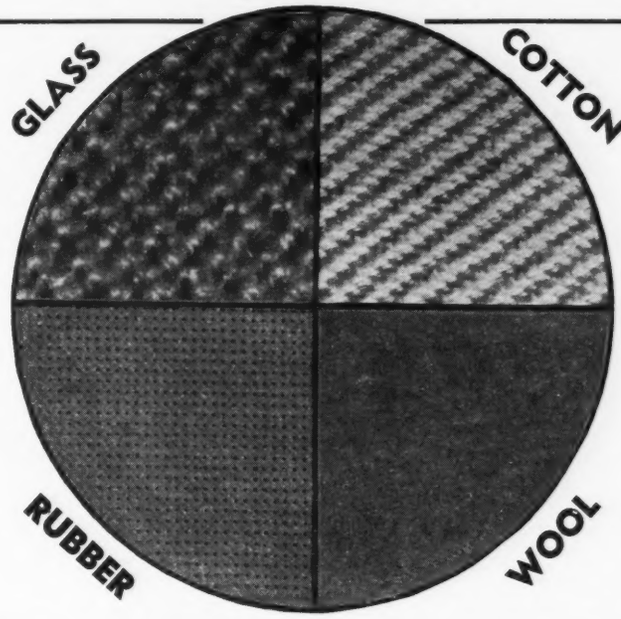


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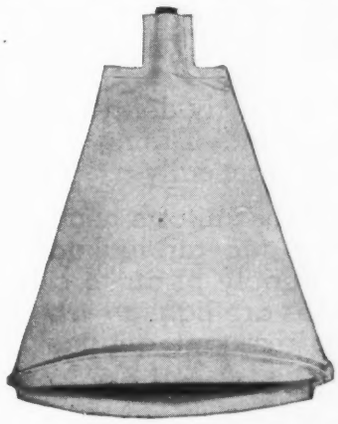

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## SOUTH DAKOTA

### Legislature Fails to Lower Ore Tax

*Homestake developing strategic mineral —New mineral experimental plant ap proved—Mica producers association i organized*

▶ Despite the support of State Mine In spector H. N. Stewart and former Gov ernor Harlan J. Bushfield, an attempt t secure a reduction in the South Dakota ore tax failed when the legislature voted 41 to 32 against a cut from 6 percent gross to 4 percent gross. Legislator from the eastern part of the State, a predominately farming section, succeeded in defeating the reduction in the face of testimony that the high rate has had a tendency to keep mining capital out of the State. A reduction from 6 per cent to 2 percent had been asked in the legislature by the Homestake Mining Co., but the proposed reduction was cut to 2 percent in a House of Representa tives committee. Representative John Mayo, of Lead, who sponsored the bill explained to the legislators that 6 per cent was bringing undue hardship to the gold mines of the Black Hills. The mines, he said, have been ordered to cease gold mining operations by the WPB, but costs running into millions will continue during the shutdown. The farm-area legislators opposed the re duction with arguments that the Home stake has been making high profits for out-of-state stockholders by using South Dakota resources. To this Mayo re plied that the resources would be worth less without development. The 6 percent tax, he said, is unprecedented in min ing laws of any state. The ore tax has been a controversial subject in the South Dakota Legislature for several terms. The law was first enacted in 1935 at 4 percent and in 1937 it was increased to 6 percent. An attempt to reduce the tax to 4 percent in 1941 also failed.

▶ Production of gold ore at the Home stake mine dropped 15 percent to 1,275,138 tons, and income decreased 13 per cent, during 1942, which was marked by a sudden curtailment of production through the WPB order closing gold mines as a war necessity measure, Guy N. Bjorge, general manager, said in his annual report, which was released this month. Curtailment of operations, which necessitated the discharge of all but 800 of the 2,200 employes of the company, was ordered last Oct. 8. A modification, to permit the company to continue hoist ing and milling broken ore, was obtained upon appeal. Mr. Bjorge also revealed in his report that the company is de veloping a manganese property in Lower California, in addition to another strate gic mineral (vanadium) property in western Wyoming. The latter is being developed by the Wyodak Coal & Manu facturing Co., a subsidiary. Only nom inal returns are to be expected from these operations, he said. During the year of curtailed production, taxes jumped $18,828.26, to $4,269,162.27, Mr. Bjorge said. The reserve of undeveloped ore totals 19,183,683, including 270,012 tons of broken ore in the stopes.

▶ An experimental plant to test the minerals of the Black Hills of South Dakota will be constructed at the South Dakota School of Mines, in Rapid City, by the State, in cooperation with the U. S. Bureau of Mines. An appropriation of $20,000 was approved by the legislature and the Bureau of Mines will provide $27,000 for the project. Five metallurgists are to be stationed at the plant by the bureau, State Mine Inspector H. N. Stewart, of Deadwood, told the legislature.

▶ Producers of mica in the Black Hills of South Dakota have organized the Mica Producers Association in a move to increase production. The new organization was formed to obtain improved official recognition as a war industry.

# MICHIGAN

## Wage Boost Granted to Copper Miners

*New contract signed with Metals Reserve Co. to meet increase in costs—Calumet and Hecla unwatering Centennial mine*

▶ The wage increases granted by the non-ferrous metals commission of WLB to employees of the Copper Range Co., Isle Royale Copper Co., and Quincy Mining Co. will add more than $1,000,000 per year to the Michigan copper district's payrolls. Approximately 2,200 employes, embracing the production and maintenance departments of the three companies, will participate in the increase. The base wage for miners will be $6.05. The increases are as follows: $1.25 per shift for employees of Copper Range; $1.35 per shift for miners of Isle Royale; $1.25 per shift for semi-skilled and unskilled employees of Isle Royale, and $1.49 per shift for employees of Quincy. The increases are retroactive to the date of expiration of the previous contracts between the respective companies and the unions: Copper Range, Oct. 1, 1942; Isle Royale, Aug. 1, 1942; and Quincy, Oct. 15, 1942. One week's vacation with pay will be granted to all employees who have worked one year or longer. Contracts between the mining companies and Metals Reserve Co. were recently signed.

▶ Calumet & Hecla is financing the unwatering and rehabilitation of the Centennial mine, idle since 1921, preparatory to resumption of mining operations. The Metals Reserve Co. will purchase the product. Installation of additional pumping equipment will double the unwatering rate. The lower levels, where mining will begin, will be free of water and ready for production within eight or ten months. A force of approximately 125 men will be required when mining starts. Capt. Samuel Richards will be in charge of operations and the ore will be stamped in the Ahmeek mill. Calumet & Hecla acquired Centennial in the consolidation of 1923. Since last May pumps have been in continuous operation, in anticipation of resumption of operations. Bottomed on the 42d level, the shaft has reached an inclined depth of 4,748 ft. below the collar.

# IRON COUNTRY

## WLB Votes Wage Hike for Miners

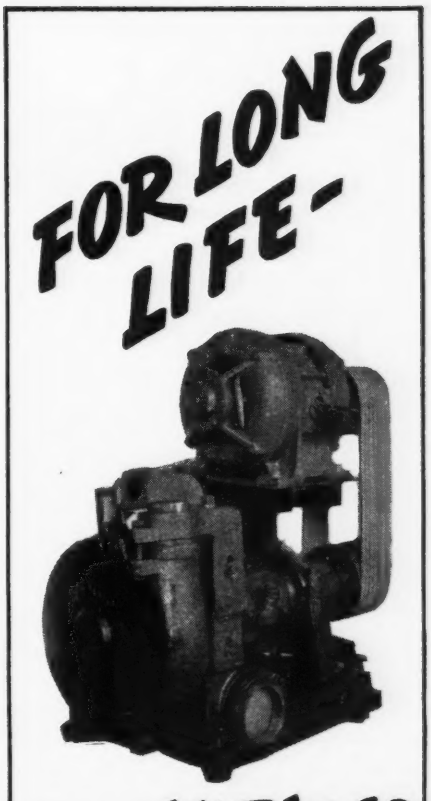
*Goal for 1943 is 97,000,000 tons—Sixteen new carriers to join fleet—Contracts awarded to strip Embarrass mine*

▶ The WPB recently announced that the Lake Superior district will be called on to ship about 97,000,000 tons of iron ore in 1943. Of this amount about 2,000,000 will be shipped all-rail, and the rest of about 95,000,000 by the Lake route. This compares with a tonnage of 92,000,000 in 1942, and 80,000,000 in 1941. To provide for the transportation of this tremendous tonnage, the United States Maritime Commission is constructing 16 new ore carriers. Eight of these are scheduled to be in commission by the opening of navigation and the remainder by the middle of the shipping season. It is reported that all these boats have been spoken for by the Lake carrier operators, and that the Pittsburgh Steamship Co., a subsidiary of the U. S. Steel Corp., has offered to purchase any of the new vessels that are not bought by the independent companies. These new boats will play a very important rôle in moving the increased tonnage, and every effort is being made to have them ready as soon as possible. The opening of navigation appears to be a little delayed from the early opening of March 25 last year. The Lake Superior district has experienced an extremely cold winter, and it does not appear that the ice conditions at the head of the Lakes will permit navigation much before the first part of April. However, every effort possible is being made by the government, the Lake carriers, railroads, and mining companies to start shipping ore at the earliest possible date.

▶ On Feb. 24, 1943, a new blast furnace was blown in at Duluth, making the second furnace for this district. This new furnace is owned and operated by the American Steel & Wire Co., a subsidiary of U. S. Steel Corp. The other furnace in this area is operated by the Interlake Iron Corp. The new plant has a daily capacity of 800 tons and will increase Duluth's annual output of pig iron by 250,000 tons. The new plant was moved from Joliet, Ill.

▶ Pickands, Mather & Co have awarded a contract for the stripping of overburden at the new Embarrass mine, on the Mesabi Range, to Winston Brothers, of Minneapolis. A contract for the diversion of Embarrass River was also awarded to J. A. Terteling & Sons, of Boise, Idaho. Actual work has not yet commenced on these two large projects, but preliminary plans are now in progress and work will start soon. It is expected to have the property in the shipping list for the 1944 season.

▶ According to press dispatches, WLB has voted to award a general wage increase of 5½c. an hour, retroactive to July 13, 1942, to the Lake Superior miners. According to the press, the board also voted for a maintenance of membership clause and a check-off system.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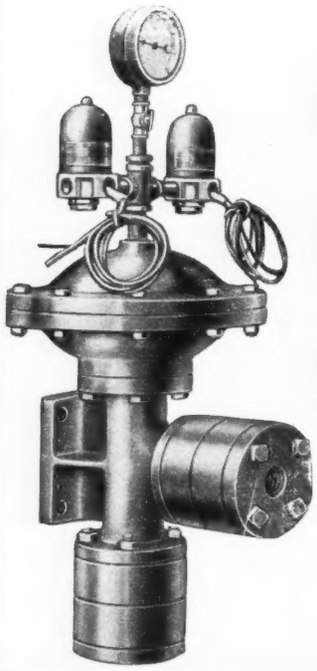

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## TRI-STATE

### Federal Undecided Over Future of Gordon Mill

*Rialto will rebuild No. 2 mill—To mine deeper level in Peru mine—Referee recommends wage increase for miners*

▶ Unusually cold weather, absenteeism, and a second major mill fire hampered Tri-State production in March. Subfreezing and near-zero temperatures marked the first half of the month, which affected production materially. The unfavorable weather was accompanied by pronounced absenteeism, which reduced the weekly output rate further. The latter factor was abruptly curtailed on March 8 by action of the Ottawa County, Oklahoma, draft board to the effect that future deferments of workers in the district's important zinc-lead mines and mills will be based on the applicant's past work record, and was followed by a decided improvement in the absentee rate throughout the mining field.

▶ Three weeks following the loss of the Gordon mill, which was the second largest producing unit in the Tri-State, no plans had been announced by the Federal Mining and Smelting Co. as to whether or not the plant would be rebuilt, or what arrangements had been made, if any, to treat ore from the various properties of the company in the Kansas-Oklahoma mining area. The mill cost approximately $150,000 when it was erected in 1937, and the replacement cost, based on present costs of labor and materials, is estimated around $250,000. The plant, one of the most modern in the field, was capable of handling 100 tons of ore an hour. It was not operating at the time of the fire—Sunday evening—having been on a schedule of six days a week 24 hours a day.

Picher Fire Chief Safford said that the blaze apparently started in the top of the mill. Two watchmen making their rounds of inspection of the company's property saw the flames at about the same time and sounded the alarm. L. G. Johnson, of Baxter Springs, district superintendent for the company, said shortly following the fire that he had no idea as to its origin. The sampling plant, storage hopper, scale house, central machine shop, and the primary crushing plant, all on the mill property, did not burn. The dummy elevators out from the mill also were not reached by the flames. Six different mining properties of the company—Davenport mines, near Quapaw; Lucky Bill, at Cardin; Gordon mines, on which property the mill was located; Muncie mines, a mile northwest of Treece; Jarrett mines, a mile west of Treece; and Lucky Syndicate mine, east of the mill—contributed ore to the central plant. All of the mines were forced out of production, at least temporarily, with their 400 employees out of work. The mill proper employed approximately 50 men on three shifts.

▶ A. G. Hull, of Joplin, president of the

Rialto Mining Corp., has announced that the company will build a new mill to replace the No. 2 plant, which was destroyed by fire, as soon as materials, equipment, and labor can be assembled. He pointed out that several months may be required to complete the new mill, which will have a capacity of nearly 50 tons of ore an hour, against 75-ton capacity of the destroyed plant. The company is completing the rebuilding of the compressor plant and derrick-hopper unit at the No. 2 property, and ore from the No. 4 property has been shifted to the No. 3 mill of the company for treatment. All properties of the company are situated to the southeast of Cardin.

▶The old Bilharz Shorthorn No. 9 field shaft, three-quarters of a mile southwest of Cardin, which has been reopened and repaired, is being deepened by F. W. Evans Mines, according to F. W. (Mike) Evans of Picher. The shaft is being sunk from the 265 to the 380-ft. level, under the supervision of Sam Ashe, company superintendent. Upon completion of the sinking operations, a large derrick and hopper from the See Sah lease, near by, will be moved to the shaft site. A railroad spur to the company's mine at the old Shorthorn mill shaft will be extended to the field shaft and ore will be shipped by rail to the Central mill of the Eagle-Picher Mining & Smelting Co. Preparations also are being made by the company to reopen the old Tulsa-Pittsburg mill shaft, in the Waco mining field, Evans said. An eight-inch turbine pump has been installed in the shaft, and pumping operations have been started. When the ground is dewatered, mine operations will be carried on around the 200-ft. level and ore will be treated over the Evans mill, a short distance to the northwest across the Kansas-Missouri state line.

▶Madison Mining Co. has reopened a shaft on the old Peru, or Queen Esther, lease, a mile and a half southwest of Baxter Springs, which is being sunk from the 200- to the 280-ft. level, according to Dewey Sims, manager, of Baxter Springs. The original shaft, which is situated between two cave-ins on the lease, was put down a few years ago by W. H. Lewis and associates. The old shaft was repaired and recribbed thoroughly before sinking operations were started. A new derrick and 150-ton hopper has been built over the shaft, with electric hoist installed. Air for underground mine operations will be obtained from the compressor plant at the company's mill on the adjoining old Euterpe lease. Ore will be trucked to the mill for treatment.

▶A rich lead mine has been opened by the Coble Mining Co. on the Coble land, in the Thoms Station area northwest of Joplin, according to W. A. Stogsdill, a member of the Joplin police department, who is one of the partners in the company. In sinking a new shaft in the south-central part of the 35-acre lease, the company encountered a rich deposit of chunk lead at the 130-ft. level in soft ground. Chunks of lead ore, weighing from 10 lb. to as much as several hun-

(*Continued on page* 114)


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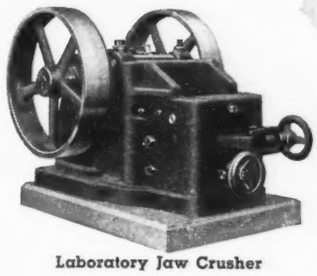

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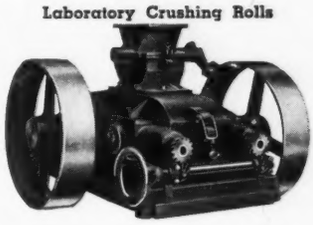

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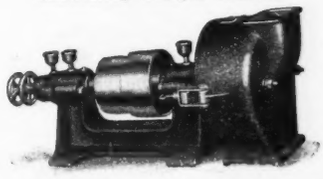

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## ▶TRI-STATE

(*Continued from page* 113)

dred pounds, were removed to the amount of about three tons in sinking the shaft 5 ft. into the rich deposit, Stogsdill said. He explained that previous churn drilling showed in the immediate vicinity of the shaft site at the 130-ft. level a 27½-ft. face of lead ore, with some zinc ore beginning at a depth of 140 ft. Ore to be milled will be treated over the custom mill of the St. Louis Mining & Milling Co. on the old Grasselli No. 2 lease, near by. Associated with Stogsdill are his brother, L. B. (Tiny) Stogsdill, former sergeant in the Joplin Police Department, who now is a corporal in the military police of the United States Army. C. A. Sleeth of Butler, Mo.; and Ted Cummings of Joplin.

▶ W. Lewis Abbott, WLB referee for the non-ferrous metals commission, late in February recommended a 50c.-a-day wage increase for employees of Tri-State mining companies the wage scales of which were reviewed here during the previous month by the WLB representative. The January review held in Joplin was a closed hearing on a petition of the International Union of Mine, Mill & Smelter Workers, CIO, for a $2-a-day wage increase for union employees of Kansas Explorations, Inc., Oronogo Mutual Mining Co., and Fenix & Sons Mining Co. It was pointed out that an increase for those companies would force other operators in the local mining field to meet such a hike in miners' pay, which includes some adjustment in contract prices paid shovelers. No further action on the wage increase has been reported.

# ARKANSAS

## Republic M & M Dryer Destroyed by Fire

*New State Geologist appointed—Hurricane mine is drifting in ore—Manganese being produced by hydraulic mining*

▶ A fire, discovered at 5:15 p. m. March 16, 1943, practically destroyed the drying plant of the Aluminum Ore Co. at Bauxite. It lasted five hours, and caused damages estimated at $25,000. It was said to have started from an overheated transformer. Some of the heavy machinery may be salvaged. This will compel a temporary stoppage in production. There were no casualties.

▶ After being drafted and redrafted, the bill to enable the State to dispose of some 300,000 tons of bauxite ore, much of it high grade, underlying the Confederate Home, at Sweet Home, passed the House by a vote of 80 to 1. The bill authorizes the establishment of a five-man board, to be known as the Bauxite Commission, to negotiate for the mining of the ore on a tonnage basis.

▶ Joe W. Kimzey, chairman of the Arkansas Utilities Commission, has been appointed State Geologist. He succeeds Dr. George C. Branner, who served in this office for twenty years. Dr. Branner joined the armed forces in 1942. Mr. Kimzey's appointment must be confirmed by the Arkansas Senate. His assistant will probably be Richard J. Anderson, who has been acting State Geologist since Dr. Branner left.

▶ Bernie Holbrook, superintendent of the Bemis Hill workings of the Ozark Quicksilver Co., near Amity, reports that several new veins of cinnibar have been uncovered at the company's mine.

▶ Production in the north Arkansas zinc and lead field in February and early March was very low. A small tonnage accumulated in mine bins but none was shipped.

▶ A test run on crude ore from the Baker and Brewer mines, operated by A. R. Seabass & Co., was satisfactory. From 100 tons of crude 22 tons of carbonate concentrates were recovered.

▶ The Silver Hollow Mining Co. expected to be producing by April 1. It operates the Silver Hollow and Silver Queen mines, in the Rush district. In late March they had its bunk company houses completed, ore hoppers installed, tramways in, and 400 ft. of mine track laid. It also had its compressor and other mining equipment installed. The mine is on the south bank of Buffalo River, about a mile below the mouth of Rush Creek. The ore is zinc sulphide, which will be milled at the Edith mill.

▶ The recently organized Rush Creek Mining Co., which embraces the Lonnie Boy, LaRue, White Eagle, and Edith mines, all in the Rush district, expects to start operations soon.

▶ The Hurricane Mining Co., under the management of J. C. Shepherd, of Harrison, has a new shaft down on the St. Joe fault and is now driving a drift across the fault. The drift is cutting through a good body of zinc carbonate ore.

▶ The mill on the Ark-Ozark properties, northeast of Bellfonte, in Boone County, is not yet in operation. J. E. Sawhill, of Harrison, in charge, states that he is having trouble getting power for the plant. He expects to have it going within the next three weeks.

▶ Par-Mar Engineering Co and E. and M. Manganese Corp. are producing, conducting both hard rock and hydraulic operations. James Wood, engineer, of Batesville, is in charge of both properties. Stanley Hanford, of Batesville, is superintendent of Par-Mar. The company is working two properties. Its hard-rock operations are on the Bone Cave Hollow ground. Hydraulic operations are on 600 acres along Lafferty Creek, west of Cushman. At Bone Cave Hollow an orebody 13 ft. thick at the outcrop has been opened. The ore is about 25 percent carbonate and 75 percent oxide. Four tunnels have been started.

▶ Hydraulicking at the Lafferty Creek property is done with two nozzles and a Manistee turbine pump with 250-lb. pressure, powered with a 125-h.p. diesel engine. Operations are in broken ground. The ore is high-grade.

# CANADA

## Parliament Encourages Prospecting Activity

*Steep Rock lets contract for surface development—New magnetite deposit near Toronto—British Columbia will grubstake prospectors*

The mining industry was given the best treatment in a number of years in the budget speech delivered before Parliament on March 2. The Minister of Finance had no increases in corporation taxes to announce and extended the time from four months to six months after the close of the fiscal year for corporations to file their income-tax returns. A practical formula was offered for encouraging the search for new sources of oil in Canada, and for new base-metal and strategic mineral deposits. The Hon. J. L. Ilsley, Minister of Finance, stated that, "it is now proposed to allow companies engaged in the mining of metalliferous and strategic minerals to write off exploration and prospecting expenses incurred in prospecting anywhere in Canada for base metals or strategic minerals. In this case, as in the case of oil, the saving in tax will be limited to 40 percent of the expenditure," as compared with a maximum of $5,000 last year.

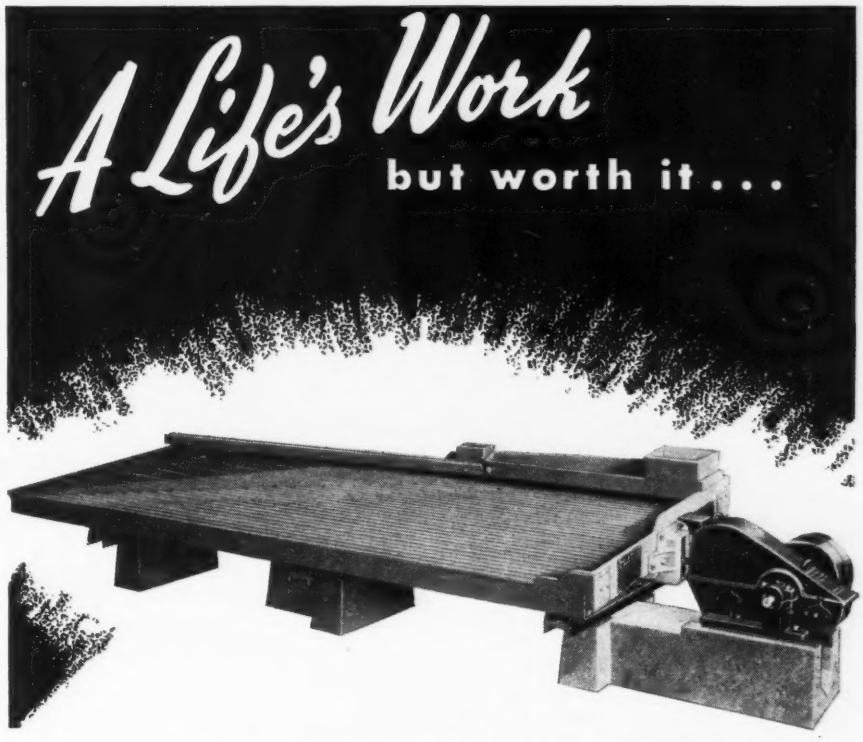
Since February, no allocations have been made through Washington for machinery or equipment for Canadian gold mines. Orders for $500 or less continue to be cleared through the Ottawa office of the Metals Controller. No official reports have been issued on how this has affected operating policy of the gold mines. Some allowance is being made for certain mines that recover arsenic and scheelite as byproducts. Discussion is being carried on between Washington and Ottawa to explore the possibilities of transferring miners from Eastern gold camps to the non-ferrous metal mines in the Western states. Both countries are cooperating closely in recruiting labor for construction on the Alcan Highway as well as on what is to be the world's largest airport, located in the region west of Hudson Bay. Plans are also under discussion for two great military highways, one of them to extend up into the Northwest Territories and the other to run from Senneterre, on the Bell River in northwestern Quebec, northeasterly into Labrador. This latter route would connect with the Abitibi Highway and the railroad from Montreal and serve as a vital supply link with large military installations in that region, where there are also potentially important deposits of copper and iron ore.

## ONTARIO

Steep Rock Iron Mines, Ltd., having successfully completed negotiations for a $5,000,000 loan from the RFC, reports satisfactory progress with the major pre-production program that is estimated to cost $7,727,500. Raymond J. Moore, who was formerly stationed at Hibbing as chief engineer for the State of Minnesota, Division of Lands and Minerals, and who has had many years of experience on the Mesabi iron range, was appointed Supervising Engineer for RFC and has gone to Atikokan to take up his new duties. More than 1,000,000 tons of good-grade hematite have been added to the proved ore reserves at Steep Rock by the results of five drilling machines that have been operating this winter. Drilling through the ice is expected to continue until the end of April. Each drill has been averaging 35 ft. a day in exploring the "B" orebody. Except for angle holes to be put down from the shore, no further drilling will be possible after the spring break-up until the lake has been pumped out. An efficient drilling method is being used, adapted from Mesabi Range procedure, whereby cuttings are recovered in a baffle tank at the drill, then dried, quartered, and classified at the mine office and a portion filed in the permanent storehouse.

A contract for the project was awarded to C. A. Pitts General Contractors, Ltd., which handled a large part of the $50,000,000 contract awarded in 1941 by the Aluminum Company of Canada for the Shipshaw power project at Arvida, Quebec. Most of the heavy equipment required for the big Steep Rock operation is available, as well as an organization of key men and skilled labor. The Seine River is to be diverted around Steep Rock Lake, roads and bridges will be

(*Continued on page* 116)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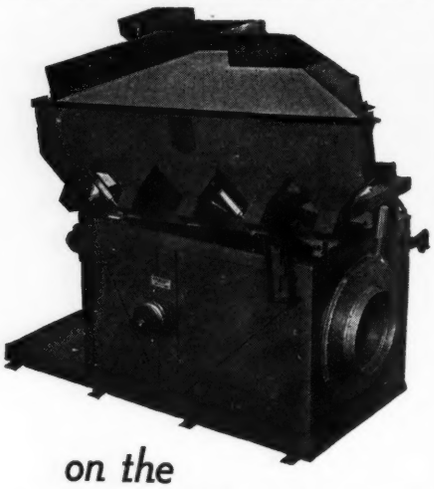

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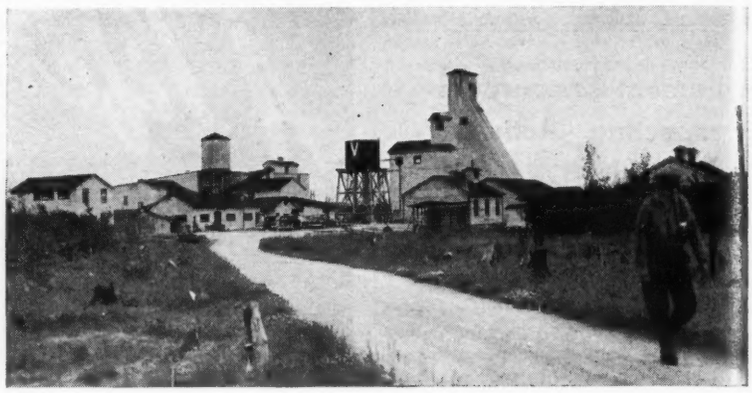

***Main shaft and 300-ton mill of Lapa Cadillac Gold Mines, Ltd., near Heva River, Quebec***

## ▶CANADA

(*Continued from page* 115)

built, as well as spillways, rock and gravel cuts, cofferdams and concrete dams. Then the lake is to be pumped out, buildings and equipment are to be installed, and the clay and silt in the lake bed stripped off the orebodies in preparation for mining at an ultimate rate of 2,000,000 tons a year. The importance of this program to Canadian national economy is suggested by a comparison with engineering contracts awarded throughout the Dominion in 1942, having a combined value of $30,000,000. General superintendent Fotheringham has the heavy responsibility of coordinating the various phases of work on this ambitious project.

▶ Hollinger Consolidated Gold Mines, which last year acquired control of extensive iron-ore deposits in Labrador, has recently become associated with the M. A. Hanna Co. in undertaking a limited program of exploration on a deeply-lying deposit of magnetite located south of Toronto. An area of 3,000 acres is held under lease by the Beverly Iron Prospecting Syndicate, which was organized in 1940 after a hole that was drilled for oil penerated magnetite in Grenville crystalline limestone at a depth of 4,300 ft. Exploratory drilling has now been recommended to check the findings of systematic geophysical work that has been carried out by members of the faculty of the University of Toronto. Robert N. Palmer, a Toronto mining engineer, has been largely responsible for the work performed by the syndicate.

▶ Mill tonnage has been holding up well at Little Long Lac Gold Mines, but recovery has declined to $13.43 a ton as a result of the lower grade that is being mined at depth. Good widths on the south vein have been developed, with some sacrifice of gold content in the section between the 17th and 20th levels. The average grade treated last year was about $1 a ton lower than in 1941, and ore reserves declined below 440,000 tons. Tungsten concentrates will be produced as soon as mill equipment has been installed, which is to provide custom facilities for several mines that are recovering scheelite in the Little Long Lac camp.

▶ E. V. Oag, secretary-treasurer of Chesterville Larder Lake Gold Mines, reports an improvement in grade to $4.95, compared with an average of $4.76 for all of 1942. In the fiscal year production amounted to $1,156,230, a decline of $226,061 from that of the preceding year, when operating profit was $449,468, against only $150,469 in 1942. Inexperienced labor was largely responsible for increasing working costs from $3.08 to $3.21 a ton.

▶ Robert C. Stanley, president of International Nickel Co. of Canada, reports that work on production expansion has been largely completed and that output last year reached a new peak. Mining operations are at the rate of 35,000 tons a day, with metal recovery exceeding the 1940 rate to the extent of 75,000,000 lb. of copper and 50,000,000 lb. of nickel a year. The number of employees increased from 21,898 in 1941 to 23,098 in 1942. Enlarged plant capacity has been combined with the organized salvage of nickel-bearing scrap to relieve the threatened shortages. Properties, plant, and equipment, less depreciation and depletion, inventories, and other assets, amount to $294,345,681. Common and preferred dividends paid last year totaled $31,090,237.

## QUEBEC

▶ Sigma Mines, the Quebec subsidiary of Dome Mines, reports 1942 gold recovery of $3,055,372, compared with $2,967,106 the year before. By treating ore that was better than mine average, it was possible to more than offset the reduced tonnage made necessary by the labor shortage.

▶ In the annual report of D. L. H. Forbes, president of Lamaque Gold Mines, ore reserves amounting to 1,130,804 tons are discussed by the general superintendent, H. N. Read. Development of important lengths of new ore took place in the block of ground between the 1,800- and 2,400-ft. levels, where raising is just being started. In the section from the 2,400- down to the

3,600-ft. level, opened up by the No. 7 shaft, no crosscutting or drifting has been done. All but a small part of the 376,561 tons mined during the past year came from above the 1,600-ft. level. A discovery of major importance was a series of irregular, steep-dipping orebodies located between the 1,200- and 1,800-ft. levels. Differing from the typical veins that averaged 5 or 6 ft. in width, the new ore consists of networks of quartz-tourmaline veinlets that extend over considerable widths and lie between and parallel to the main veins. This ore is being mined by the room-and-pillar system, with shrinkage stoping of rooms 35 ft. wide.

## BRITISH COLUMBIA

▶An act to exempt certain free miners from performing and recording work on mining properties, pursuant to the mining laws of British Columbia, has been accepted by the legislature. It is expressly designed to remove the handicap of maintaining assessment work on gold claims to permit of greater prospecting for base-metal and strategic-mineral deposits. The act is retroactive to June 1, 1942, and is of particular benefit to the number of American dragline-dredging operators who acquired placer leases in this Province during 1941.

▶Purely as an emergency measure to help alleviate the existing shortage of labor, the Minister of Mines has introduced a bill to permit females over the age of eighteen years to be employed in the surface operations of any mine or metallurgical plant in British Columbia. This act overrules anything to the contrary contained in the "Coal Mines Regulation Act" or the "Metalliferous Mines Regulation Act."

▶A bill introduced before the legislature on March 15 provides for governmental grubstaking of prospectors, a measure advocated ever since the commencement of mining in this Province. It will permit assistance to the extent of $300 to "wartime prospectors." These are described as any holder of a free miner's certificate, who has been honorably discharged from any of His Majesty's services, who has been resident in the Province during the year preceding any application for a grubstake under this act.

▶British Columbia has adopted legislation similar in intent to the Wagner Act in the United States. Amendments to the Industrial Conciliation and Arbitration Act, as introduced by the Hon. George S. Pearson, Minister of Labor, call for compulsory collective bargaining and provide penalties for offenses against the Act.

▶The mining committee of the legislature has been authorized to investigate and try to reconcile the various estimates of iron-ore and coking-coal deposits in the coast district of this Province. The resolution directs that Dr. J. F. Walker, Deputy Minister of Mines, and other officials of the department be called before the committee "to go carefully into reports, records, and documents of the Department of Mines regarding these raw materials."


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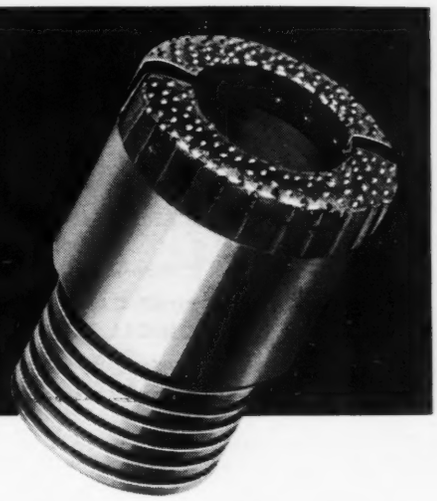

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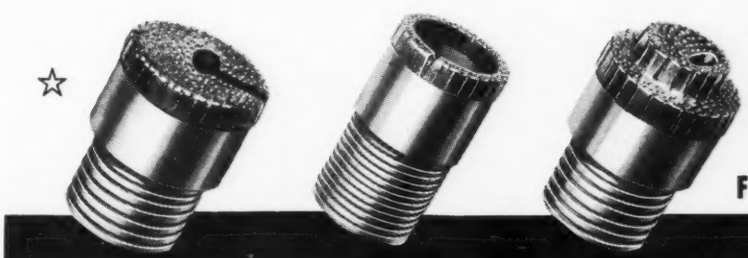

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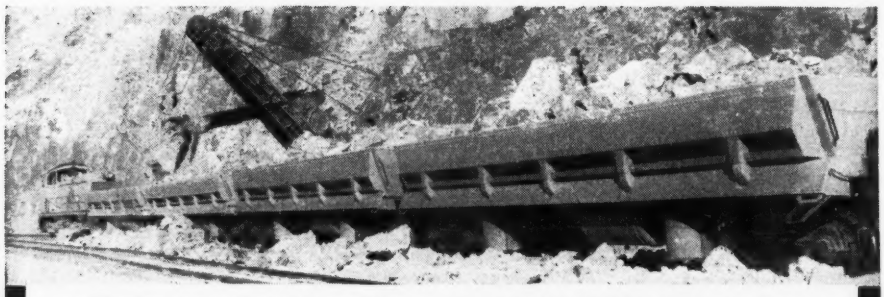
▶Net profit of Premier Gold Mining Co., Ltd., for 1942, after all writeoffs and provision for taxes, was $388,871, equal to 7⅜c. per share. This compares with $490,936, or 9¾c. per share, in 1941.

▶Dismissal of a miner for abusive language towards a shift boss was the cause of a one-shift walkout at the Copper Mountain mine of The Granby Consolidated Mining, Smelting & Power Co., Ltd., on Feb. 23. However, the labor-management committee acted promptly, arranged for suitable apology, which was accepted, and the men returned to work on the following day. The situation brought to a head some smouldering discontent and resulted in the organization of the Copper Mountain Mine Workers Union, which almost overnight acquired a membership embracing the majority of the workers. Due, no doubt, to the prior organization of the Granby colliery employees, the new union applied for affiliation with the United Mine Workers of America, but this was apparently unsuccessful, as on March 14 a resolution was adopted to apply for a charter from the International Union of Mine, Mill, and Smelter Workers.

▶The extraordinary general meeting of shareholders of Grull Wihksne Gold Mines, Ltd., held on Feb. 20, unseated the new board of directors, headed by W. J. Asselstine, and restored to office the former board headed by W. C. Ditmars. The meeting was held as a result of the surprise ousting of the now reinstated board at the annual meeting of

(*Continued on page* 118)



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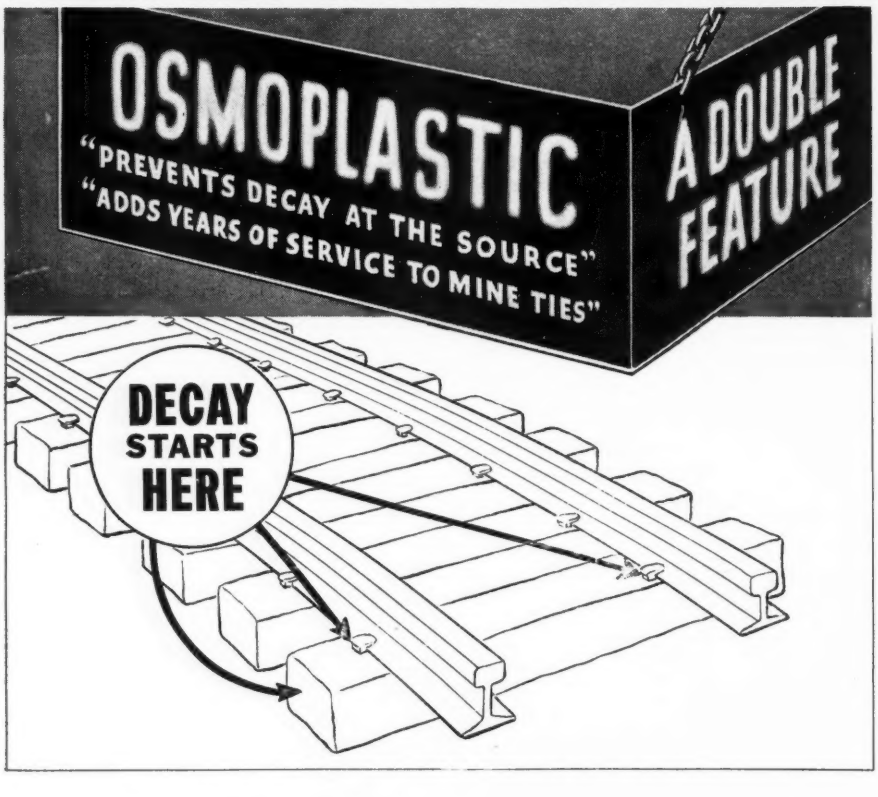


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## ▶CANADA

(*Continued from page* 117)

stockholders on Dec. 30 last. The vindication of the Ditmars group signifies approval of the development of the "Blue Eyes" group of tungsten claims near Rossland by Bayonne Consolidated Mines, Ltd., in which Grull Wiiksne holds a controlling interest. At last reports Bayonne had intersected a promising lead at this property after crosscutting for approximately 100 ft. and had commenced drifting on the vein.

▶ Development of the Whitewater silver-lead-zinc mine in the Slocan district has been retarded by unfavorable weather. An extension has been granted the Kootenay Belle Gold Mines, Ltd., holder of an option-purchase agreement under which an immediate program of extensive development was to have been undertaken. Gasoline power has been provided for the compressors, due to the freezing of the creek supplying the hydro-power.

▶ International Metals Inc., Ltd., a newly incorporated company, has acquired the Van Roi lead-zinc mine, four miles east of Silverton in the Slocan district, and plans to bring this former producer again into operation, subject to the satisfactory conclusion of negotiations in progress for working capital. The 100-ton mill is to be overhauled and reconditioned, with a view to possible enlargement. A crew is at work underground under the direction of John F. Coats.

▶ During the last quarter of 1942, Base Metals Mining Corp., Ltd., Golden district operator and subsidiary of the Mining Corp. of Canada, treated 15 percent less ore than in the preceding quarter. This was due largely to the labor shortage but also in some measure to faulty equipment. During 1942, ore milled was 10.5 percent less than in 1941. Estimated operating profit was $167,000.

## MEXICO

### Railway Car Shortage Hampers Production

*Some units also affected by oil shortage —Two co-operatives in difficulty—Real de San Felipe to install mercury furnace*

▶ Mexican mining looked brighter with the heading off of the strike that confronted 67 major companies, including the A.S.&R. and Peñoles units. Work, announced the Labor Ministry and the national miners union, is now normalized in this No. 1 Mexican industry. Though the labor situation seems to have been cleared up for the time being, another trouble is besetting a wide sector of the business: shortage of railroad cars, which is also hampering other industries. Several mining companies in various zones, particularly the central, far western, and some of the northern, are particularly hard hit in this regard. They are finding it difficult to

move ore to smelters and the finished product to markets at home and abroad. They have been obliged to store ore, metals and minerals; some of their storage plants are packed to overflowing. This situation is working a hardship on these companies, as they have obeyed the government's call to increase production and hired more workers. Their expenses, high wages, and other operating costs keep on, but their incomes are sharply reduced.

▶Copper mining is on the upswing in Sonora, one of the leading zones for that mining. Cananea Consolidated (Greene Cananea) and Moctezuma are out front. They have considerably increased their works and engaged numerous workers. These companies are largely served by the Southern Pacific Railway of Mexico.

▶Lack of fuel oil is another worry of the mining industry. Cia. Explotadora Minera, S. A., Guanacevi, Durango, has been obliged to suspend work for this reason, as there is no fuel for its diesel engines. Petroleos Mexicanos, the government's oil company, has been asked to relieve this condition. A delegation of bankers is in Houston, Tex., negotiating with oil refineries for the purchase or renting of a fleet of truck tankers that they hope to operate directly from Tampico to provide oil for industry and agriculture.

▶Work in the Villalpando mine of Cia. Minera El Cubo, S. A., Mineral de El Cubo, Guanajuato, has been disrupted by a cave-in. Nobody was hurt, but employees of this mine have appealed to the Labor Ministry for aid, declaring that they are in a precarious economic plight.

▶The long-drawn-out litigation involving mining properties in Chihuahua, near Chihuahua City, valued at 3,000,000 pesos ($625,000) and owned by the estate of Santiago Stopelli, millionaire Italian mining man who died many years ago, is still in the courts. The latest action was the granting by the federal supreme court to the national miners union of an injunction restraining the Chihuahua district court from demanding that the union post a cash bond of 3,000,000 pesos, value of the property, to guarantee its representations in the case. The union told the court that it lacks that much money and could not find a bondsman or bonding company to accommodate it. The union had sued the Ministry of Finance, which had seized the Stopelli properties on the ground that the heirs had failed to pay taxes on them for several years, and contracted with the union to work the tracts, and then, when the heirs had retained rights to the properties, had ousted the union. The high court ordered the Chihuahua tribunal to set aside its demand for the 3,000,000 peso bond and limit the cash deposit to the amount of probable damage and loss to the union that its ousting from the properties entails, an amount the lower court must calculate.

▶Labor peace has been attained by Cia. Minera Guadalupe de Sultepec, S. A., Sultepec, State of Mexico, with payment of the equivalent of five weeks' wages to the 53 workers it dismissed. This settlement was reached with intervention of the Labor Ministry. The miners' union had threatened a strike unless the dismissed men were reinstated and paid full wages during the time they were off the payroll. Similar trouble confronts Cia. Metalurgica Anita, Guanacevi, Durango, Apartado Postal 8, Guanacevi, which is alleged to have dismissed several workers without official sanction. The union threatens a strike unless these employees are reinstated.

▶The cooperative society that has been working properties of Cia. Minera Dos Estrellas, S. A., a French-owned company, El Oro, State of Mexico, and Talpujahua, Michoacan, is in desperate economic straits, according to Congressman Porfirio Ramirez when he complained to the federal government that Herlindo Flores, miners' leader, had been kidnapped by federal troops in El Oro and banished to Talpujahua. Flores was kipnapped, Ramirez charged, because he had violently complained that 4,000 persons, families of the cooperative's members, are near starvation, he said, because the cooperative is paying its members only 1.25 pesos (27c.) a day. Flores was quoted as complaining that the cooperative administrative council has not rendered a report on the society's economic condition for more than a year. Flores is said to have tried to force the council to pay the members more money.

▶Warning is given mining concessionaires by the Ministry of National Economy that the mining law obligates them,

(*Continued on page* 120)

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## ▶MEXICO

(*Continued from page* 119)

under pain of fines, to keep clearly marked the boundaries of their tracts at all times. Obeying this law, the warning said, is to the concessionaires' interest and would eliminate much difficulty all around.

▶ Chihuahua, Sonora, Zacatecas, and Guanajuato, important mining states, have pledged an all-out effort, in cooperation with the federal government, for road construction and reconditioning.

▶ Federal government aid has been asked by the chiefs of the cooperative that has been working mines at El Promonitorio, Durango, for some time, and which has frequently been in difficulties. The municipal authorities, the complaint said, have embargoed part of the cooperative's property to enforce payment of taxes long in arrears.

▶ Cia Minera Real de San Felipe, S. A., will soon install a 40-ton Gould furnace on its leased mercury properties near Torreoncillos, State of Chihuahua, 22 miles northwest of Parral. Development work has been proceeding satisfactorily, three of the six parallel veins having been cut 200 ft. below the outcrops by a 400-ft. crosscut. A crew of 20 is being employed in the development work. W. Henry Seamon is supervising operations and is president and manager of the company, of which John H. Pope is secretary-treasurer. Juan D. Morales, gold-mining and business magnate of Chihuahua, is a director.


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## VENEZUELA

### Mining Handicapped by Lack of Supplies

***Transportation problems also mounting—Development proceeding at El Pao—Asbestos production to start soon—Mercury mine needs furnace***

▶ The gold-mining industry, which produced 3,596,189 grams in 1942, is entirely dependent on the U.S. and Great Britain for chemicals, steel, steel tools, and explosives. Lack of supplies in the past six months has resulted in a sharp decline of gold output, which will be more noticeable during the current year. It is realized that gold is not an essential factor in the war-effort, but it is a big factor in Venezuela because of the large number of people whose livelihood depends on this industry. Unfortunately the country has no base-metal mines big enough, or sufficiently developed, to which unemployed gold miners can be transferred. Venezuela believes that this should be taken into consideration by the U.S. government.

▶ As in previous years the biggest gold producer was the New Goldfields of Venezuela, Ltd., operating at El Peru and Caratal, in the El Callao district. During the company's last financial year (from July 1, 1941, to June 30, 1942) the production figures compared with 1940-41 were as follows:

| | 1941-1942 | 1940-1941 |
|---|---|---|
| Dry tons milled | 220,868.0 | 225,794.0 |
| Average grade dwt/ton recovered | 9.0 | 9.2 |
| Gold recovered, oz. | 99,626.0 | 103,846.0 |

Since Aug., 1942, New Goldfields has gradually reduced its tonnage milled until at present it is crushing at approximately 40 percent of its maximum capacity.

▶ During 1942 the "A" Lode mine was put on a salvage basis, but the ore disclosed in the driving of the main haulage tunnel connecting the Union and Sosa-Mendez mines was blocked out and stoping was begun. The adjoining properties of La Compania Francesa de la Mocupia have also been forced to reduce their output somewhat, but the management expects to continue operating until the second half of 1943, when present supplies will be exhausted. Work in recent months has been confined entirely to the Columbia XI mine, where developments in the latter part of 1941 and during 1942 disclosed a considerable tonnage of high-grade ore. This put the mine in a better position than ever.

▶ Other properties still operating include La Experiencia (treating ore from "Increible" property), La Paz, and Vuelven Cara.

▶ Several mining companies were reluctantly forced to discharge a number of their employees and reduce their staffs towards the end of 1942. This led to a corresponding increase in the number of men working with the batea on alluvial areas, and as a result an

increase in the alluvial gold output is anticipated during 1943.

▶The alluvial diamond deposits of the Rio Surukun (Gran Sabana) and the Rios Pao and Lower Caroni were again the main sources of diamonds. The number of workers in these areas steadily grew as the gold mines reduced their number of employees. This is the principal reason for the increase in the diamond output during the year to 34,048 carats, against 29,399 carats in 1941.

▶The Iron Mines Co. of Venezuela, a subsidiary of Bethlehem Steel, is developing a high-grade iron ore deposit at El Pao, near Upata, Estado Bolivar, and continued its program of preparatory work, including the completion of roads, the ore-loading plant, and the railway to its shipping port of Palua on the Orinoco, some 1½ miles from the town of San Felix. The delay in obtaining supplies, especially construction materials, has seriously retarded the development of this property.

▶The mercury mine of San Jacinto, near Carora, Estado Lara, came into production in 1941 and was worked continuously until August, 1942, and in that period the total production from cinnabar ore treated was 2,113 kg. of mercury. During 1942 government engineers and geologists made a detailed study of the property and reported a developed reserve of 7,000 kg. of mercury. Unfortunately, the cost of production was so high that the company could not meet expenses, even at the present price of the metal. The high costs were due to the low grade of cinnabar treated and the inefficient type of retort in use. Consequently the company decided to suspend operations until a modern retort of greater capacity and efficiency can be obtained, but the present shipping situation is such that it is most unlikely that this property will be reopened for a considerable time.

▶In December, 1942, the government sent a commission of engineers and geologists to examine and report on the geology and condition of the Aroa mines. These mines were worked intermittently from colonial times, but in 1936 they were abandoned when the price of copper fell below 6c. per pound. It was found that the mine entrances were badly caved and that the old Aroa mine was under water below the Holman main haulage level. It was concluded that the long and expensive operation of reopening these mines, containing an unknown but probably very limited reserve of ore, would not be attempted by any private enterprise under present conditions.

▶La Compañia Anonima Minas de Amianto de Tinaquillo reports an increase in the proved reserves on its asbestos property. During the past year the erection of mill buildings, workshops, and staff quarters was completed and in the field further geological and prospecting work was done. It had been hoped to commence production of asbestos fiber before January, 1943, but, owing to unavoidable delays in the shipment of the plant and mill machinery, this was not accomplished. The mill has a treatment capacity of 960

(*Continued on page* 122)


**THE ATLAS TYPE "A"**

Built for main line haulage in metal mines. Comes in 3 and 4 ton sizes for 18 inch track gauge in any desired size for wider gauges. Includes the ATLAS patented double-reduction spur gear drive that gives the best performance of any type of locomotive drive.

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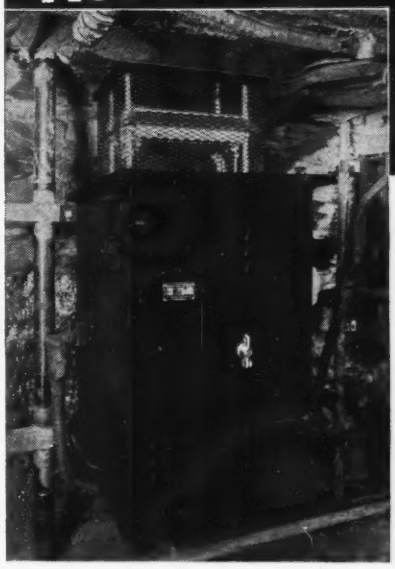
**RAISE PRODUCTION PEAKS**



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I-T-E CIRCUIT BREAKER CO.
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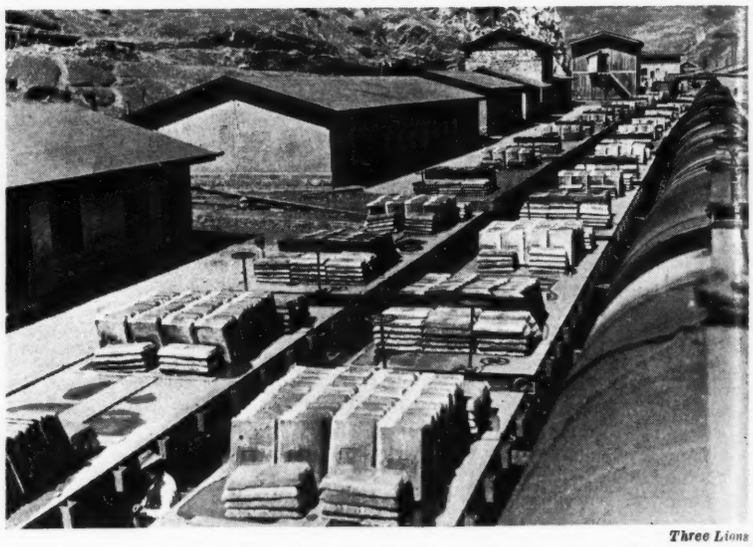


Three Lions

*Copper ingots from smelter of Cerro de Pasco Copper Corp., Oroya, Peru*

## ▶VENEZUELA

(*Continued from page* 121)

tons of rock per 24 hours and the estimated output of asbestos fiber is 6,000 tons per annum. Michael Messel, who has had considerable experience of asbestos production in Canada, has acted as technical director and has been mainly responsible for the mill, which is based on Canadian practice. The deposit is to be worked as a glory hole, and the broken asbestos-bearing rock, mainly serpentine, will be conveyed by cars to a 24x36-in. jaw crusher and reduced to 5-in. ring. The product from this crusher will be passed on a 30-in. wide conveyor belt to a 4-ft. Symons cone crusher, set to $\frac{3}{4}$ in., and the barren rock will be removed from a sorting belt. After drying, the product from the cone-crusher will be conveyed to a 500-ton storage bin. The fiber will then be aspirated through hoods placed over sets of shaking screens and transferred to collectors, whence it will be passed over a set of cleaning screens to remove the dust and any fine rock particles. The fiber will then be graded according to length, in standard rotary graders and by means of a standard Canadian asbestos fiber-testing machine. Power for the mill and workshop will be supplied by two 490-hp. diesel units generating electricity at 440 volts.

▶There has been a marked increase in the search for, and development of, non-metallic minerals during the past twelve months. At present government engineers are making a study of the mica deposits occurring in the pegmatite dikes near Timotes, in the Andes.

▶Limestone and shales have been sampled and analyzed and two new cement plants are projected, one of which is expected to be the largest producer in South America.

▶Occurrences of graphite and ochre have been inspected and sampled, but are not of economic importance at this time, because of low grade and/or distance from shipping centres.

▶A number of good-quality coal deposits are being examined and developed in various parts of the country, only one of which is close to the coast. This is the Venezuelan government's coalfield at Naricual, which is being developed to produce four times the amount of coal in 1943 that it produced in the past year. This results from the growing demand from the Argentine for more coal following the big drop in the importation of this fuel from England.

▶The question of transportation of mine supplies from coastal ports into the interior of the country is becoming more serious. The National Transport Committee has applications on file for more than 18,000 tires and finds it extremely difficult to apportion the few that are available among the many essential vehicles. Brazil has agreed to supply 6,000 tires, but these have not yet arrived. During the past six months freight rates into the interior have been increased 60 to 70 percent and the number of trucks in service has been much reduced. The mining companies are often handicapped by the late arrival of supplies, especially of diesel and lubricating oils, which are obtained from Curacao and Aruba.

▶Unless there is an improvement in the shipping situation during the current year, the result will be a complete stoppage of all mining activitity in the region south of the Orinoco. This presents a serious problem for the Venezuelan government, which had to deal with a similar one in the past year affecting the oil fields. It is hoped that the U. S. government will find it possible to ship the minimum amount of supplies to keep these mines at work. The actual weight of materials required for one year's operations of the gold mines does not exceed 1,500 tons, only half of which is steel. Stoppage of work in these mines would affect at least 10,000 people who directly or indirectly obtain their livelihood from the mining industry and its auxiliaries. The total capital invested in operating gold mines is about 66,000,000 bolivars.

# AUSTRALIA

## Decline of Gold Mining Hurts West Australia

*Broken Hill North improves reserves—Cocks Eldorado placer tin more difficult—Electrolytic Zinc handicapped by labor shortage*

### WESTERN AUSTRALIA

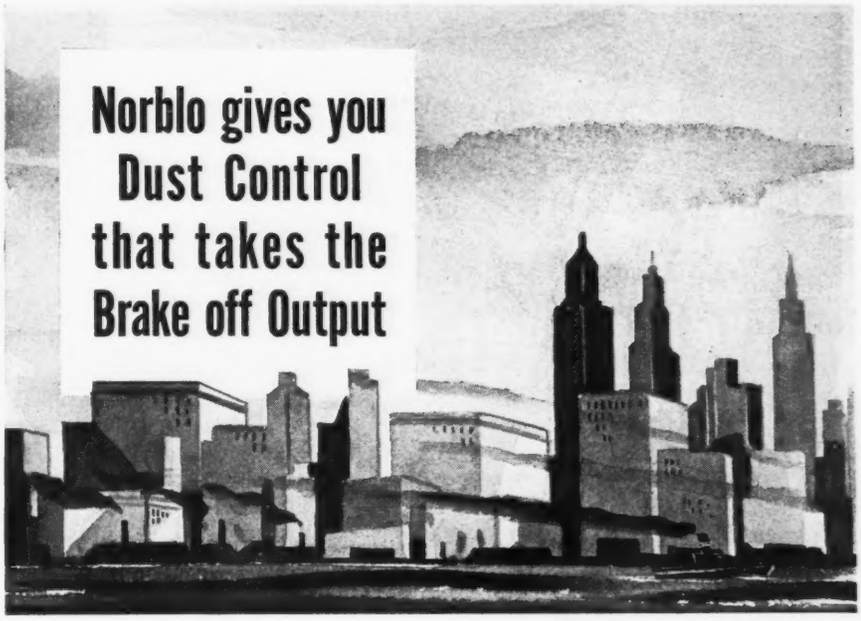
▶In 1942 a considerable decrease took place in the State gold yield, which was the lowest for a number of years. The decreased production, compared with 1941, was 261,138 oz. and its value, £A2,985,948. A further decrease is to be expected this year, which will be accompanied by a corresponding repercussion upon the economic life and affairs of the State. The labor quota allotted to the gold mining industry is 4,500 men, a number which has not yet been reached through call up for military and labor purposes, but it is expected that the mines will be reduced to this minimum early in the year. The object of the quota is to keep the mines in safe condition, assisted by as much production as is possible. No consideration has been given to the retention of efficient labor so that the severity of the restriction may be minimized, nor have the companies any power to retain even the few men essential for safety on the properties, as all can leave a mine if they so desire, regardless of the damage which may result. During the past year there were no new finds of gold. Reduced numbers of working parties are still in the field, but existing conditions give no encouragement to prospecting. The importance of the industry, and its decline, are shown by figures on annual production, viz: for 1940, 1,191,481 oz.; for 1941, 1,109,318 oz.; for 1942, 848,180 oz.

Total production of gold since the inception of the industry is 48,736,015 oz. Gold mining is Western Australia's greatest industry and is the mainstay of the community. By far the greater part of the country is poor to arid, so that the pastoral and agricultural industries are by no means rich. Gold mining has been responsible almost solely for the development of the State, for the necessarily sparse population of its inland areas, and for the provision of its social and community services. At the present time Western Australia feels that the action of the federal government with regard to the gold-mining industry is unwarrantably rough on the community and its future economic life.

### NEW SOUTH WALES

▶North Broken Hill, Ltd., in the year ended June 30, 1942, earned a net profit of £A422,147, a decrease of £A70,000 compared with the previous year, the decrease being due mainly to increase in mine expenditure, in taxes and royalty, and to falling off in investment income.

(*Continued on page* 124)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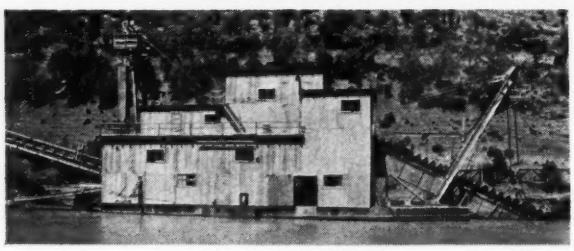

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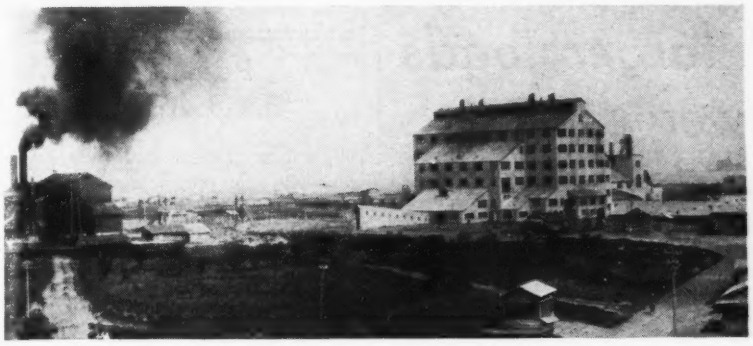
## ▶AUSTRALIA

(*Continued from page* 123)

As an offset, there was an improvement in mine production through higher metal prices, increased metal content of the ore, and higher recoveries. Production statistics are not published, owing to wartime regulations applying to base-metal mining. It was stated that the mine position was satisfactory. Due to withdrawal of labor by government, there was a slight decrease in the tonnage of ore mined and treated, but improvement in the grade of ore and in recoveries made possible a higher production of metals than in the previous year. In the ore-dressing mill excellent work was accomplished and recoveries of all metals were increased. Ore developed during the year exceeded extraction, with a resulting increase in reserves. The estimated tonnage of ore reserves disclosed by normal development, and exclusive of ore located by diamond drilling, in the North, British and, Junction sections, was 5,340,000 long tons, compared with 5,232,000 tons at the end of the previous year. Excellent results have been obtained in underground diamond drilling. Work was carried out below the 2,600-ft. level to obtain data relative to the pitch and dip of the orebody, on its downward continuation. The drill intersections proved the existence of high-grade ore to a depth of 2,970 ft., at which depth the drill entered the footwall. The information given by three boreholes shows that the orebody is continuing on its normal trend. Of the total ore mined during the year, 83.4 percent was drawn from the North section.

## VICTORIA

▶Cocks Eldorado Gold Dredging, N.L., is operating a dredge equipped with 10-cu.ft. capacity buckets and a monthly capacity of 200,000 cu.yd., on Reedy Creek, at Eldorado, in the northeast part of the State. Gold occurs in association with cassiterite in the alluvium, and the company is therefore the only producer of tin in Victoria, with the exception of parties of working miners. The gold-tin oxide concentrate is recovered on the dredge and re-dressed in the tin-recovery section on shore. This part of the operations has been increasing in difficulty owing to the greater fineness of the cassiterite as dredging proceeds further from the point of origin of the tin; also, the proportion of heavy sand is increasing, thus, separation of coarse sand and fine tin, without incurring high loss in the tailings has become a problem. In the year ended Sept. 30, 1942, ground worked totaled 2,401,460 cu.yd. which yielded 4,986 oz. of smelted gold and 87.47 tons of tin oxide concentrate. This return compares with 4,500 oz. of gold and 86.38 tons of concentrates recovered from 2,106,816 cu.yd. of ground in the previous year. The average value of the ground treated in 1942 was 6.86d. and costs were 4.2d. per cubic yard. Costs were 0.19d. per cubic yard less than in the previous year, notwithstanding considerable in-



**TARGET FOR AMERICAN BOMBERS**

**100-ton-per-day Anderson process sponge-iron plant at Kuji, Japan**

creases in the cost of wages, stores, and renewals. The reduction was due to a constant supply of clean water for dredging, to more economical methods of constructing dams by the use of caterpillar tractors and scoops, and by more economical facilities for the disposal of slimes. Slime disposal is important and involves a material item in costs, for regulations relative to pollution of rivers and streams are strictly administered. Settling ponds have been increased in area by 16 acres. The use of welding is becoming increasingly important as it becomes more and more difficult to obtain renewal parts and steel supplies, and welding equipment has assisted materially in the economical operation of the company's dredge.

## TASMANIA

▶ Electrolytic Zinc Co. of Australasia, Ltd., which produces metallic zinc at the Risdon works, near Hobart, and mines silver-lead-zinc ore at Rosebery and Williamsford, on the west coast of the island, earned a net profit of £A303,916 in the year ended June 30, 1942, after providing £A125,000 for amortization and depreciation, £A25,000 for mine depletion, and £A212,000 for taxation. Production costs were higher during the year, due to increases in wages and the introduction of "wartime allowances," to lower operating efficiency under wartime conditions, and to advance in the prices of operating supplies. Sales of products in Australia were at controlled prices which did not compensate for the substantial rise in production costs. The Risdon plant was operated at full capacity, but operating and engineering sections suffered severely through disruptions caused by labor irregularities. The construction program, which aimed at important extensions to give increased and much needed output, was seriously curtailed by shortage and inefficiency of labor. These troubles are characteristic of all basic war industries. High-grade metallic zinc is being disposed of in Australia and overseas, as is also cadmium, and special products, such as high-grade cobalt metal and zinc-base die-casting alloy, are being produced. At the West Coast mines, at Roseberry, output has been maintained, as the company has been fortunate in securing miners from companies on the mainland which have ceased work. To assist in the production of copper, the Hercules mine is winning ore of a higher copper content than normal, replacing a quantity of the usual lead-zinc ore in the mill feed. A copper-lead-silver concentrate is being produced in addition to the customary lead concentrate and zinc concentrate. Though development work was less than usual, satisfactory development on the main Roseberry orebody compensated for ore extraction, and ore reserves remain practically unchanged at 1,500,000 tons of average grade ore. In this section of the company's operations much difficulty has arisen through inefficient and insufficient labor.

## FIJI ISLANDS

▶ Emperor Gold Mining Co. Ltd., at Vatukoula, on the Island of Viti Levu, earned in 1942 a net profit of £A141,975, or in Fijian currency, £126,201, after provision for depreciation, development, amortization, and taxation. Shortage of labor, together with the rationing of compressed air and power during the year, restricted development work. The Wallace Smith shaft was completed at a depth of 675 ft. from the collar, or 33 ft. below the No. 7 level, and plats were cut at Nos. 6 and 7 levels and the pumps installed at No. 7 level. Ore passes, grizzlies, and control chutes were completed at Nos. 3, 4, 5, and 6 levels. Operating costs in Fijian currency, per ton of ore milled, were:

| | |
|---|---|
| Mining | 6s. 7.77d. |
| Milling | 16s. 8.84d. |
| General expenses | 4s. 2.10d. |
| Total | 27s. 6.71d. |
| Development redemption: | |
| Ordinary | 3s. 6.00d. |
| Special | 3s. 6.00d. |
| Total | 34s. 6.71d. |

At No. 5 level some of the best ore yet seen in the mine has been opened up, but much development is necessary to determine tonnage and average grade.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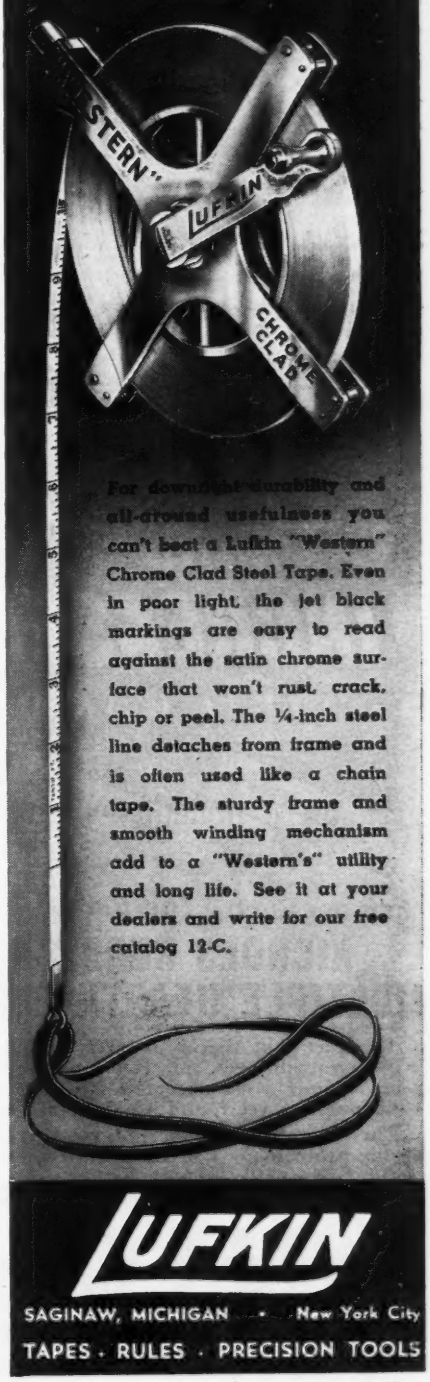


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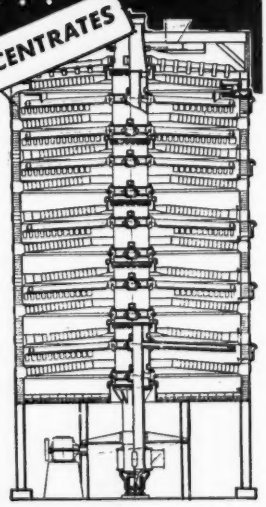

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# AFRICA

## Passing Peak Rand Apparently

*Ground failures hinder future of Geldenhuis—Blyvoor reef continues good—Loans of equipment solve some supply problems*

▶ Witwatersrand reports generally show that the gold-mining industry is giving ground, in profits if not in production; but the very slight declines make it clear that its retreat is a stubborn one. A majority of the companies report decreased earnings in January, and the decreases of these are larger than the increases of these reporting improvement. The cause of the decline is chiefly the difficulty of obtaining essential supplies as needed. This situation has led to the setting up of the National Supplies Council, which is giving attention to the industrialization of South Africa, to the development of the country's manufacturing possibilities to the point which will make necessary the import of little other than raw materials, and particularly to the exploitation of other mineral resources, including large deposits of iron and coal and the expansion of its steel output. South Africans are talking about the prospect of a gradual decline in gold production during the coming decade, followed by a rapid decline thereafter. Whether they are worrying about gold too soon remains to be seen. Reduced taxation might add many years to the life of its gold mines and prompt the development of many new ones.

▶ Last year the Transvaal mines milled 67,000,000 tons of gold ore—275,750 tons less than in 1941, but almost 2,500,000 tons more than in 1940. The 14,120,617 oz. produced was down just over a quarter of a million ounces. It is computed that the recovery averaged 34s. 2d. (about $8.50) per ton, a reduction of only 7d. per ton from the preceding year's average, and that the average of working costs, 21s. 2d per ton, was the same as 1941 and only 6d. up from 1940. Working profits were some £2,000,000 lower, but the decrease in distributable profits was much greater, due to war taxation. In view of all that happened last year, supply difficulties and the withdrawal of men for the fighting services, results were better than should have been expected.

▶ Blyvoor is continuing to find 100 percent of all the reef—the new Carbon Leader—opened and sampled very rich and quite evenly mineralized, all seven of the quarterly reports so far issued telling the same story. The reef is very narrow, 12½ in., but the values still average over 2½ oz. per ton. A working profit of £18,765 was made in the December quarter and about half of this was expended on capital account. The management was criticized for starting with as small a mill as 8,000 tons a month. However, it would be difficult to supply a much larger tonnage from the mine now that the war has made it advisable to discontinue work on its No. 2 shaft, which was stopped in May, 1940.

▶Geldenhuis Deep appears to be on the way out. Its latest quarterly report says it will not be possible to maintain production at the present rate (183,000 tons of ore the last quarter) for more than a few months longer, owing to the exhaustion of the available reserves of ore. Serious hanging wall disturbances continuing throughout the past year have rendered inaccessible a large part of the ore reserves, which are widely scattered. Available reserves are reduced to 162,000 tons averaging 3.3 dwt. over 48-in. width. The possibility of continuing production profitably on a much-reduced scale is being investigated.

▶It is a significant fact that all the mines developed during the past dozen years along the Witwatersrand formation are making good records of production and earnings—significant because their development was based on information obtained by extended diamond-drilling campaigns. This proves beyond question that the diamond drills told the truth. Western Reefs and East Geduld, two of the new mines, set up new high records of profits earned in January, and in this respect they seem to stand alone.

▶An indication of the methods being used to overcome difficulties created by the war is supplied by Western Reefs lending one of its large hoists and an auxiliary hoist to Spring Mines and West Springs to enable them to continue sinking the new joint shaft in the southern part of their properties. Springs Mines and West Springs had been advised that there was no prospect of their getting the hoists, ordered a long time ago, until after the war. The loan of the hoists will not inconvenience Western Reefs in the workings of its own mine, remaining equipment being more than adequate.

▶Alpine (Barberton) Gold, a South African enterprise not on the Witwatersrand, mined 93,321 tons of ore last year against 57,953 tons the preceding year. The result of this big increase was 12,838 oz. of gold, against 10,694 oz., heads declining from 4.25 to 3.35 dt. per ton. After charging £16,310 to development, £5,388 depreciation, and £5,388 spent on options, a profit of £4,036 remained.

▶In East Africa, the scene a decade ago of many prospecting ventures and a number of gold discoveries, production is generally on the decline. Here and there operations have been abandoned. One real mine seems to have been developed, the Geita, of the Kentan Gold Areas group, but this property has been obliged to cut output by one-half because of difficult supply conditions. Kavirongo Gold operated at a loss last year, and the coming annual meeting will decide as to its future.

▶Recalculations of ore reserves by several of the Witwatersrand mining companies show that the plan to restrict advance development work, adopted about a year ago, has reduced tonnages quite generally; but the reserves of all these companies are still sufficient to warrant the continuance of this policy for some years if shortages of steel and other supplies should persist.


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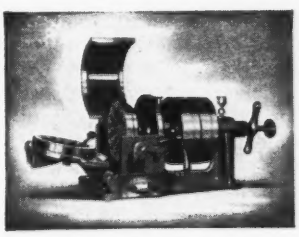

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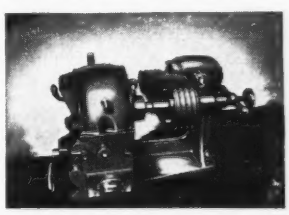

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2260 EAST 15TH ST., LOS ANGELES, CALIF.
BRAUN-KNECHT HEIMANN CO. San Francisco, California
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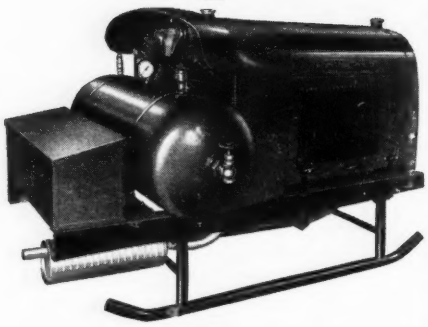
Power

and plenty of it!

With the new, Victory Model 60 cu. ft.

SMITH AIR COMPRESSOR



uses only 1 gallon of gasoline an hour

SAVE 3-WAYS

SAVE TIME: The Smith is lightweight, flexible, -- easy to move from one job to another. SAVE MONEY: -- on original purchase price -- on operating costs. SAVE GASOLINE -- more important than ever before.

60 cu. ft. size (illustrated above) uses less critical material than any other standard compressor. Made with FORD MOTORS and standard parts. Repairs and parts available at any Ford garage. Automatic unloading and idling; self-starter. Wire, phone or write TODAY for complete information.

*With a Ford Motor and shop facilities you can assemble your own Smith Compressor. We will furnish a Smith Compressor Head and Accessories with complete instructions for mounting.*

*Write for free Booklet*

GORDON SMITH & CO.

INCORPORATED

505 College St. Bowling Green, Ky.


## Tariff, Reciprocal Trade and Mining

(*Continued from page* 78)

greatest market for access to smaller markets. Nevertheless, the abandonment of this policy hardly seems feasible, considering our most-favored-nation commitments and our general interest in promoting trade and good will throughout the world. However, it would seem that we could protect our interests more adequately by being less tolerant of discriminatory trade practices on the part of other nations and denying concession benefits to those countries indulging in such practices. To be sure, pre-war Germany, a flagrant sinner, was ostracized from participation, but nothing was done in regard to the countries which entered into discriminatory practices with Germany. Also, during the life of the program no denial was made to countries which made "back-door" escapes from the spirit of the program, such as direct subsidization of their domestic producers, exchange controls, export duties, and expropriation of American property.

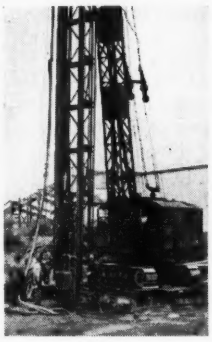
### Senate Ratification

Although it is mere hair-splitting to contend that a trade agreement is not a treaty, which is simply a major contract between nations, agreements are not submitted for Senate ratification, despite the plain behest of the Constitution.

This policy is defended by involved legalistic documentation, endeavoring to prove that agreements are not of enough consequence to need ratification and by the argument that ratification would open the door to the same old log-rolling evils that the reciprocal trade program seeks to cure. State Department officials contend that to demand Senate ratification would simply wreck the program. Their opponents think that ratification would be a healthful check upon zealotry and inconsistency in its administration.

Aside from the legal issues involved it must be admitted that the log-rolling argument has weight; how much is a matter of opinion. Most people would probably agree that we ought to live up to our Constitution or amend it, and that it is up to Congress to cure itself of some of its vulnerability to sectional influences. Also, it can be pointed out that the Reciprocal Trade Act itself is more controversial and subject to log-rolling than any single treaty. Congress has renewed this Act twice and will probably renew it again. The public will probably not take seriously the inconveniences which administrators must undergo in defending their acts in public hearings, or the natural desire of diplomats to work under cover. Further-


THE *Safe* WAY . . . TO END *Any* HOSE LINE!



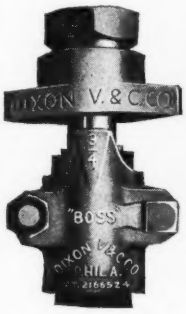
"G J-BOSS"

GROUND JOINT STYLE X-34

FEMALE HOSE COUPLING

*For Steam • Hydraulic • Air*

Designed to assure maximum strength, durability and safety under all conditions. *Washerless* construction consists of soft-to-hard metal seal that will not leak, regardless of wear or the presence of abrasive particles. "BOSS" Offset Interlocking Clamp anchors coupling to hose with a powerful grip that is proof against straight line leaks and blowoffs. Sizes ½" to 4", inclusive.



"G J-BOSS"

GROUND JOINT

AIR HAMMER COUPLING

Same *washerless*, leakproof construction as style X-34 coupling, described above, and furnished with equally efficient "BOSS" Interlocking Clamp. No washers to replace . . . no loss of working pressure through leaky connections . . . no danger of blowoffs. COMPACT TYPE, style XLB-61, ½" and ¾". HEAVY TYPE, Style XHB-72, ¾" and 1".

*Sold by Manufacturers and Jobbers of Mechanical Rubber Goods*

DIXON VALVE & COUPLING CO.

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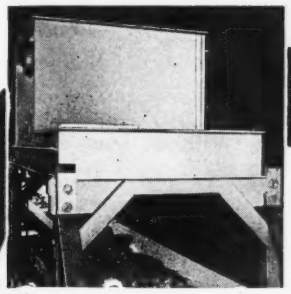
MERRICK WEIGHTOMETER



AUTOMATIC WEIGHING WITHOUT PAUSE IN CONVEYING!

The Merrick Weightometer provides a continuous, automatic accurate weight record while material is in motion on conveyor. It weighs without interrupting conveyor service.

Applicable to any size belt conveyor, horizontal or inclined. An accurate and dependable means of keeping constant check on production.

Write for Bulletin 375

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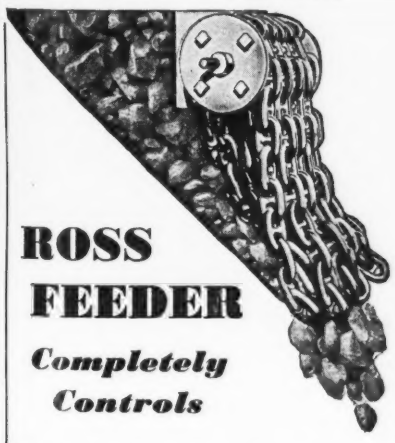
PASSAIC, NEW JERSEY, U. S. A.



ROSS FEEDER

*Completely Controls*

the flow of any size material from Storage Bins, Hoppers or Open-Dump Chutes to Crushers, Conveyors, Screens, etc.

High in efficiency. Low in maintenance and power consumption.

Furnished in sizes to suit your operation. Scalping unit to fit your chute if desired. Send full particulars for recommendation.

**ROSS SCREEN & FEEDER CO.**
19 Rector Street, New York, U. S. A.
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more, other countries seem to be able to subject trade agreements with us to ratification. No doubt ratification would slow up the reciprocal trade program, but it would put the whole policy on a sounder basis, whereas it is now periodically on tenterhooks.

### The Present Outlook

Obviously, the United States cannot look forward to international political cooperation, either for collective security or toward the prevention of future wars, and expect to maintain a philosophy of economic isolationism. On the other hand, it is unrealistic for anyone, whatever his attitude on tariff, to assume that the public is going to tolerate sudden, avoidable alterations of the status quo. We shall have enough problems of readjustment from a war to a peace economy, including the reemployment of men from the armed forces, to make intolerable the thought of creating additional dislocations by drastic tariff reductions. If trade barriers are to be liquidated, the process will have to be gradual and orderly, giving affected industries and individuals time to readjust and relocate themselves.

If as a nation we intend to back up the provisions of the Atlantic Charter referring to equality of access to the world's raw materials and trade, the reciprocal trade machinery is the only instrument so far devised which offers any promise of effectuating such a policy. Also, with certain modifications, the organization set up to administer the program can be built into a mechanism for injecting consistency and impartiality into tariff-making. Therefore, unless we intend to serve notice on the world that we are contemplating the repudiation of our international commitments, it seems advisable to concur in the renewal of the Reciprocal Trade Act. However, in view of considerations discussed in this article, it would seem reasonable to ask Congress to insist upon the following provisions:

1. Senate ratification of trade agreements, or an appropriate constitutional amendment to the contrary.

2. Building of a genuinely expert, impartial, trade agreements organization, with requirement that proceedings be based on substantial facts, without short-cuts or zealotry.

3. Insistence that a concession on a given commodity should be made only in an agreement with the country likely to reap the principal benefit from the concession.

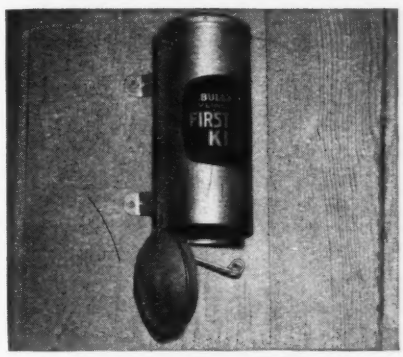
4. Requirement that concession benefits should be withdrawn from nations not living up to the spirit of the program by indulging in discriminatory trade practices, the erection of new barriers to trade, or currency depreciation.

What's New IN SAFETY

NEWS ABOUT SAFETY EQUIPMENT AND METHODS

**Well pleased...**

"Our men are very well pleased," said the safety engineer of one of the West Coast's largest shipyards, "with the Morenci Safety Belts we have given them to wear on scaffold jobs. They have repeatedly commented on their light weight and easy adjustability, which, from my point of view makes them completely successful."



**Cylindrical kits**

Manufacture and distribution of Bullard Cylindrical first aid kits has now been resumed. They differ but little from those made of drawn aluminum (now on critical materials list) inasmuch as they retain all their weatherproof characteristics for outdoor mounting.

To the kit, however, has been added a hinge that keeps the lid from being misplaced or lost. This feature is illustrated.

The handy roll-up containing the unit packets drapes easily over the arm, leaving both hands free to administer first aid. A flick of the clip on the bottom of the cylinder releases this roll.

★ ★ ★

More complete information on any of the above items may be had by writing for product literature. Descriptions are condensed from the bulletin "What's New in Safety," which will be mailed to you monthly on request.

**E. D. BULLARD CO.**
275 EIGHTH STREET, SAN FRANCISCO, CALIF.
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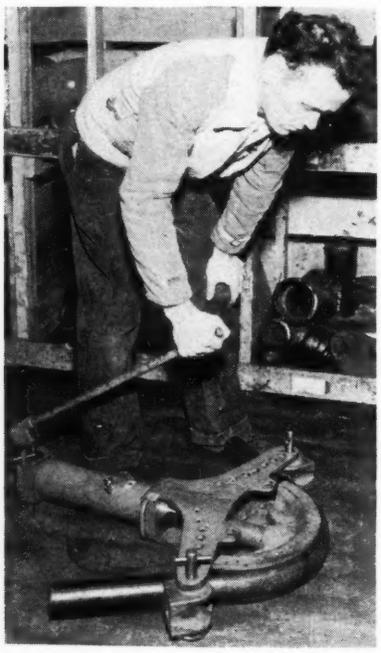
EVERYTHING BULLARD IN SAFETY

# Equipment News

## Pipe-Bending Machine

SMOOTH EVEN BENDS of any desired degree up to 180 deg. in pipe of any size between $\frac{3}{8}$ in. and 3 in. are said to be easily produced by a new machine recently announced by Tal's Prestal Bender, Inc., Milwaukee, Wis. Shown in the accompanying illustration, the machine is



easily portable and can be quickly set up or dismantled.

The pipe is bent by hydraulic pressure applied through sets of formers accurately machined for each pipe size. Gross weight of the entire machine, including seven sets of formers housed in a wooden carrying box, is 170 lb., but the essential units as used on the job, for example, with 2-in. pipe, weigh 98 lb. Mild steel bars up to 2 in. in size may also be bent in this machine.

## Drill Hole Stemming

UNDER certain rock or water conditions, use of ordinary sand or clay plugs for blast-hole stemming becomes extremely difficult. To provide drill-hole plugs usable under any conditions, Heitzman Safety Blasting Corp., Shamokin, Pa., developed a plug made of asbestos which is said to offer numerous advantages. Inserted into the drill hole following the powder charge, the plug is expanded by driving in a wooden wedge which is part of the plug itself. A better seal for the hole is provided, and, under certain conditions, it is said that blasting efficiency may be increased 25 percent by use of the device. The plugs, as well as further details concerning them, may be obtained from the maker.

## Scheelite Analyzer Card

MOLYBDENUM content of certain scheelite ores can be estimated by use of fluorescent light in a method developed by engineers of the U. S. Geological Survey. (See *E.&M.J.*, Sept. 1942, p. 65.) A colorimetric comparison chart was suggested for use in this method in which standard scheelite samples would be suitably arranged for comparison with the unknown sample. Ultra-Violet Products, Inc., Los Angeles, Calif., announce that they have been licensed by the Department of the Interior to manufacture these charts under patents granted to R. S. Cannon, Jr., and K. J. Murata, of the U. S. Geological Survey. The card contains twelve standard samples of scheelites containing molybdenum in amounts varying from zero to 48 percent. Price of the card is $2.50.

## Light Weight Stretcher

A MINIMUM of critical materials is used in the new Stretcher-Kot manufactured by J. L. Schilling Sales Co., New York, N. Y. The side rail is made of wood, fabric is of No. 6 cotton duck, and the only metal parts are the bolts used to fasten the legs to the frame.

Suitable for all emergency and standby plant use, the stretcher weighs less than 12 lb., but is strongly built to withstand rough handling.

*New M. S. A. eyeshield shown attached to the Skullguard head protector manufactured by the company. Made of a transparent plastic, the shield may be attached to any of these hats already in use. Details will be furnished by Mine Safety Appliances Co., Pittsburgh, Pa..*

## Drying Without Dust Loss

NEED for separate dust-collecting equipment in connection with rotary dryers is said to be eliminated through use of a dryer recently introduced by L. R. Christie, New York, N. Y. A metal drum, divided into compartments to give increased drying surface, is enclosed in an insulated steel casing that utilizes the entire surface of the outer shell for additional heating area. Furnace gases never come into contact with the material being dried, and because of the consequent absence of draft, minus-300-mesh material is said to be handled with no appreciable dust loss. Charging and discharging are continuous, however.

Any kind of fuel or heating medium can be used with this new rotary dryer, and it is claimed that efficiencies better than 60 percent can be obtained.

## Hard-surfacing Welding Rod

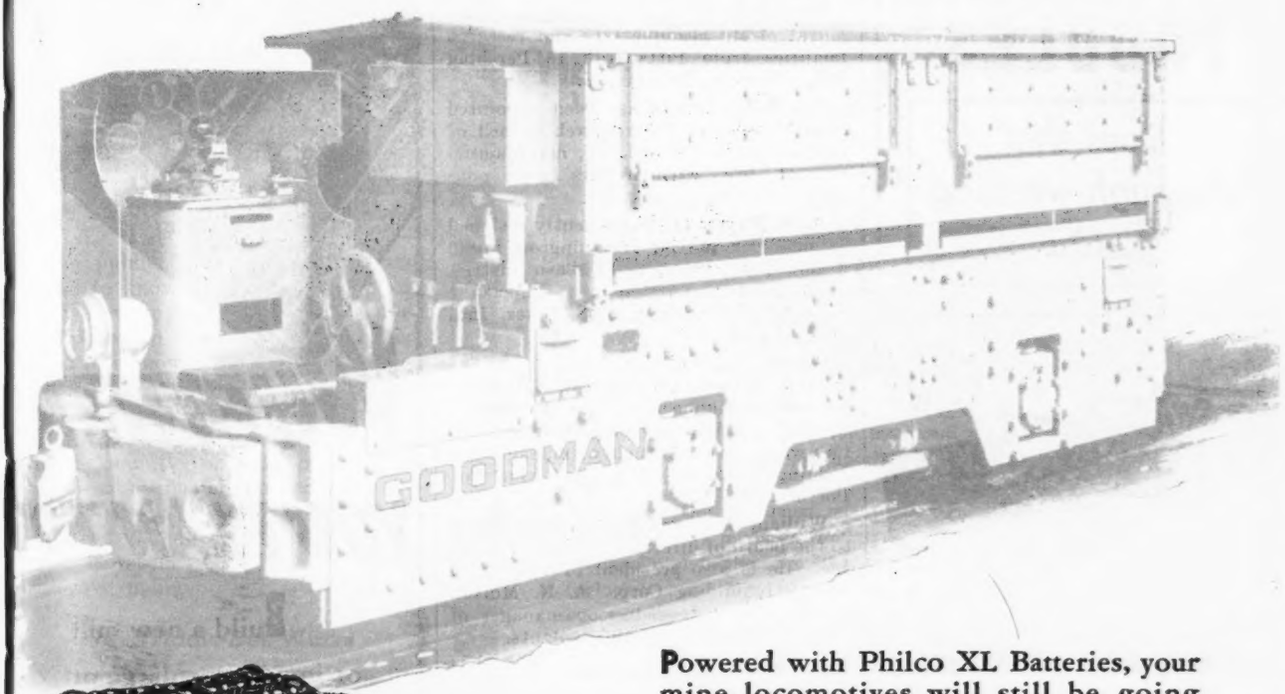
DEVELOPED for use in building up track rollers, rails, and other similar machine parts subjected to impacts and heavy bearing wear, a new welding rod was recently announced by R. G. LeTourneau, Inc., Peoria, Ill. Tournaweld Roller-weld, as the new product is called, is characterized by rapid burn-off, smooth operation, and uniform deposit of tough, highly alloyed, hard-surfacing metal, which is sufficiently soft to be subsequently ground. Best results are secured with the new rod by operating on reverse polarity with a d.c. machine. It is furnished in 14-in. lengths in diameters of $\frac{5}{32}$, $\frac{3}{16}$, and $\frac{1}{4}$ in.

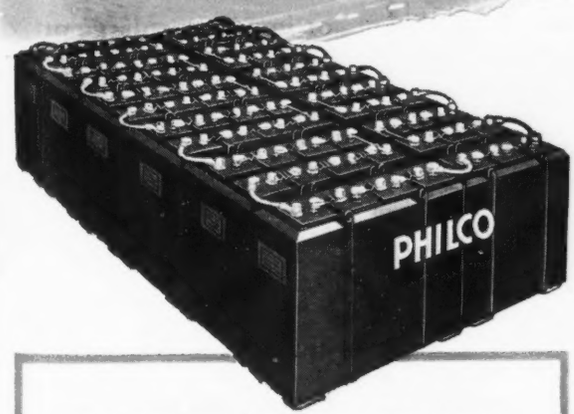
## INDUSTRIAL NOTES

**Army-Navy "E"** for excellence in the production of war materials has been awarded to the following companies: **Crane Co.**, Chicago, Ill.; **Babcock & Wilcox Co.**, Augusta, Ga.; three plants of **Fairbanks-Morse & Co.**; **Cummins Engine Co.**, Columbus, Ind.; **Caterpillar Tractor Co.**, Peoria, Ill.; **Barrett Division, Allied Chemical & Dye Corp.**, Frankford, Pa. A star was added to the "E" flags already flying at the following plants: **Jenkins Bros.**, Bridgeport, Conn.; **DeLaval Steam Turbine Co.**, Trenton, N. J.; **Handy & Harman**, Bridgeport, Conn.; three plants of **Western Electric Co.**; **Worthington Pump Co.**, Harrison, N. J.; **Maryland Magnesium Corp.**, Elkton, Md. **Maritime Commission "M"** pennants were awarded to **Mine Safety Appliances Co.**, Pittsburgh, Pa., and **Jenkins Bros.**, Bridgeport, Conn.

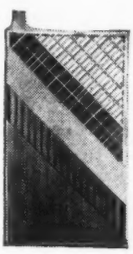
**Peterson Filters Engineering Co.**, Kearns Bldg., Salt Lake City, Utah, has been organized by **C. J. Peterson** and **C. Lynn Peterson**, formerly of Eimco

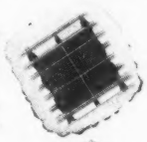
# GET 10% MORE CAPACITY WITH PHILCO XL BATTERIES!



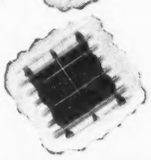

**10% GREATER CAPACITY...SUSTAINED HIGH VOLTAGE...LONG PRODUCTIVE LIFE**





(*Upper right*) Philco "K" Process produces a flint-hard, porous plate.

(*Lower right*) Ordinary plate drying.



(*Left*) Philco Triple Insulation—Glass Fibre Mats, Slotted Rubber Retainers, rugged Philco Separators.

**Powered with Philco XL Batteries, your mine locomotives will still be going strong long after standard batteries are back on the charging racks!**

**Philco XL Batteries give you *10% greater capacity*... every charge lasts 10% longer!**

**Here's why: Philco XL grids give greater plate area without increase in outside battery dimensions... Philco "K" Process plates and Philco Triple Insulation assure maximum retention of active material!**

**Today, when the country is begging for greater ore production, Philco's 10% reserve power, sustained high voltage and extra wallop are vitally important! Use the coupon to get latest Philco Mine Battery Catalog.**

**PHILCO CORPORATION, Storage Battery Division, Trenton, N. J.**

Send me the latest Philco Mine Battery Catalog.

NAME_____

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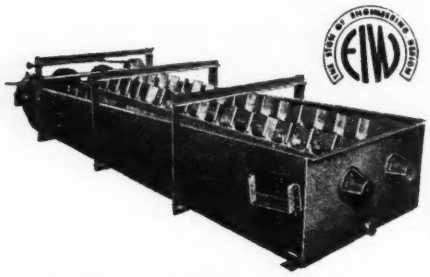
**REPLACE WITH RUGGED, HIGH CAPACITY PHILCO MINE LOCOMOTIVE BATTERIES!**

# IMPROVED ACTION of the PADDLES

*Does that thorough washing JOB*



## Eagle Log Washer

### FOR WASHING MINERAL ORES

● Improved action of the paddles does that thorough washing job.

The greater cutting or abrading action of the specially designed Chilled Semi Steel 36" diameter paddles may be exactly what you require now.

The paddles subject the ore that is being washed as well as the foreign material, to a persistent abrading and grinding action. This scours the ore and at the same time breaks down the foreign material, and the wash water carries the worthless slimes and fines away.

The wash water for these machines is introduced through inlets in the bottom of the tub from which the water flows in a rising current, carrying all foreign particles already loosened by the powerful action of the paddles to the surface. Here the surface water current carries them to the water discharge or lower end. This complete removal of foreign matter leaves a thoroughly cleansed ore.

Send samples of the material to be washed for inspection and laboratory test. Also, tell us of your present set-up. We will be glad to be of assistance to you in determining the type of washer you require. No obligation on your part.

**EAGLE IRON WORKS**
DES MOINES IOWA


Corp., to provide complete service in the field of filtration, including design, testing, and installation.

**New Jersey Zinc Co.** announces some changes in organization by election of the following officers: **James E. Hayes,** chairman of the board; **Henry Hardenbergh,** president; **Marshall L. Havey,** executive vice-president; **Federick H. Baxter,** vice-president and controller.

**Meehanite Metal Corp.** announces removal of its headquarters and research facilities from Pittsburgh to Pershing Bldg., New Rochelle, N. Y.

**Dr. P. W. Leppla** has been appointed chief chemist of the research branch of **Cardox Corp.,** Chicago, Ill., manufacturers of fire extinguishers and non-explosive mining systems.

**A. H. Weymann,** who recently resigned as manager of the Worthington Pump & Machinery Corp's. El Paso district office, is now connected in an important capacity with **Barber S. S. Lines, Inc.,** Brooklyn, N. Y.

**Stoody Co.,** Whittier, Calif., announces the appointment of **John P. Caluwaert** as welding engineer, serving the eastern Oregon and Washington territory. Mr. Caluwaert was formerly manager of welding sales for J. E. Haseltine Co., Portland, Ore.

**William S. Newell** has been appointed to the board of directors of Mack Trucks, Inc. He is also president of **Todd-Bath Iron Shipbuilding Corp. A. N. Morton** has been named production manager of the Mack company's three plants.

## BULLETINS

**Filter Cloth.** William W. Stanley Co., Inc., New York, N. Y., has just issued a new bulletin which includes not only descriptions of the properties and uses of several varieties of filter cloth, but samples of the cloths as well.

**Ball-Bearing Lubrication.** Lubriplate Division of Fiske Brothers Refining Co., Newark, N. J., has prepared a bulletin, No. 1-43, describing care and lubrication of ball and roller bearings.

**Photoelectric Relays.** General Electric Co., Schenectady, N. Y., has issued a bulletin, No. GEA-1755-E, containing application data on photoelectric relays for a number of industrial uses.

**Synchronous Motor Control.** Primary and additional functions of the various G-E synchronous motor control units are described in Bulltin GES-1724D, recently published by General Electric Co., Schenectady, N. Y.

**Welding Aluminum.** "Welding and Brazing Alcoa Aluminum" is the title of a new booklet available free of charge from Aluminum Co. of America, Pittsburgh, Pa.

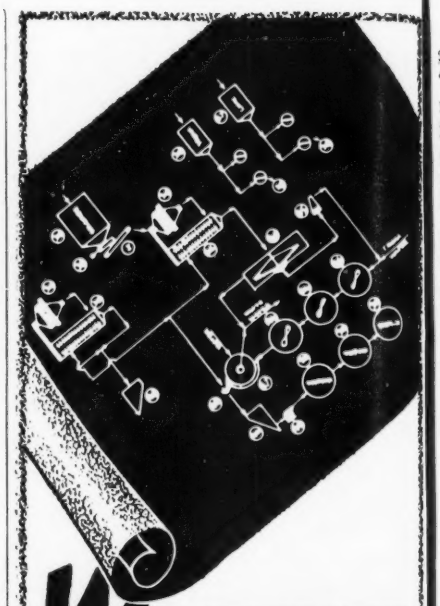
**Rotary Dryers.** A new 36-page bulletin, No. 16-C, available from Hardinge Co., Inc., York, Pa., describes completely the construction, application, and operation of six types of Ruggles-Cole dryers.

**Arc Welding Standards.** NEMA announces release of a new "Electric Arc Welding Machine and Electrode Standards," No. 42-81, which contains new and revised material on both a.c. and d.c. welding equipment. The booklet is available for 75c from NEMA Engineering Dept., 155 East 44th St., New York, N. Y.

**Materials Handling.** Robins Conveying Belt Co., Passaic, N. J., has prepared a bulletin, No. 121, describing the complete line of Robins handling machinery for coal, ore, and other bulk materials.

**Rubber Conservation.** Pioneer Rubber Mills, San Francisco, Calif., recently published a booklet containing practical suggestions for lengthening the life of mechanical rubber goods.

**Ball Bearings.** Reground and reconditioned ball bearings are discussed in a new bulletin released by Ahlberg Bearing Co., Chicago, Ill.

# WHETHER YOU PLAN TO

Build a new mill or improve, enlarge or modernize your present plant facilities, it will pay you to investigate WKE construction experience and facilities. The fact that WKE has built or modernized the majority of important mines and mills in the West is worth your careful consideration.

*Send for our new*
"TURN KEY MILLS"
*Bulletin*

**BUY WAR SAVINGS BONDS**

**WESTERN KNAPP ENGINEERING CO.**
CONSTRUCTION ENGINEERS
COMPLETE MINE AND MILL OPERATIONS
760 FOLSOM ST., SAN FRANCISCO
Los Angeles · Sacramento · Salt Lake City · Spokane · Denver · Phoenix

(*Continued from page* 81)

gold monetary unit, to be called the "Bancor." This leaning toward currency stabilization is an about face for Lord Keynes, who is best known as an advocate of "monkeying" with currency relationships. It probably signifies that he is honest enough to backtrack when he realizes that further propagation of the idea of using currency manipulation as an instrument of effectuating national political or economic policies can lead only to chaos. The move toward stabilization, whether under British or American sponsorship, or both, will undoubtedly be welcomed by the mining industry, which has always been "hard-money" minded.

The public will no doubt be permitted to know more about the plans of the government in regard to monetary policy in the near future. Legislation to empower the President to devalue the dollar and use the two billion dollar stabilization fund expires June 30. Chairman Somers of the House Committee on Coinage, Weights, and Measures has announced that public hearings will be held on this issue and that the Administration will be asked to disclose its plans for future monetary policy.

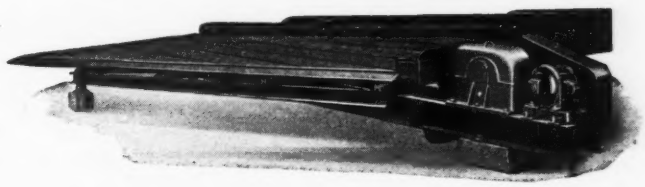
### Tax Tiddle-Dee-Winks

IN LATE MARCH a pitched battle occurred in the House over the Ways and Means Committee bill to satisfy the public demand to put income taxation on a current basis, a la the Ruml plan. The committee bill, a puny "weasel," simply provided for a 20 percent payroll deduction to set up reserve funds to cover most of the average taxpayer's liability. The House rejected the committee bill, sending it back to committee "for further study," but also rejected the Ruml plan and the substitute worked out by Congressman Carlson of Kansas, a minority member of the committee.

Probably the House action does not indicate a lessening of enthusiasm for "pay-as-you-go." Congress is bound to look favorably on anything that has such wide public acceptance. The action seems to reflect the wish of the House to save the face of its most important committee, plus the unwillingness of some members of the majority to let the opposition get credit for important legislation. The action of the committee in failing to write a bill to make taxes applicable to the current year's income undoubtedly reflects a certain amount of pique in the government over being "beaten to the post" by an outsider.

Chairman Doughton of Ways and Means announced that the issue would be shelved. This seems unlikely, because of the overwhelming public demand for the Ruml plan, or something similar.


"CONCENTRATE" ON GREATER CONCENTRATE YIELD



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### Renegotiation Exemptions

WAR CONTRACTS and subcontracts for most of the metals and minerals involved in the government's production program are exempt from the renegotiation statute, according to a joint regulation that has been issued by the War and Navy Departments, the Maritime Commission, and the Procurement Division of the Treasury.

The following have been exempted:

Aluminum ingots and pigs; alumina; calcined or dried bauxite; crude bauxite; antimony ore and concentrate; antimony metal; antimony oxide; arsenic; asbestos fiber; bismuth.

Chrome ore and ferrochromium not processed beyond the form or state suitable for use as an alloy or refractory in the manufacture of steel; bichromates; chromic acid.

China clay; kaolin clay; fireclay; brick and tile made from clays other than kaolin, china, or fire; coal, prepared and run of mine.

Copper ore and concentrate; copper billets, cathodes, cakes, ingots, ingot bars, powder, slabs, and wirebars.

Fluorspar ore; fluorspar fluxing gravel; ceramic fluorspar; acid grades fluorspar; gypsum, crude and calcined; iron ore and pig iron.

Lead ore; refined lead in bars, ingots, and pigs; antimonial lead in

(*Continued on page* 134)

(*Continued from page* 133)

bars, ingots and pigs.

Magnesium, pigs and ingots; magnesite; manganese ore; ferromanganese; silicomanganese; phosphate rock and superphosphate; ferromolybdenum; calcium molybdate; molybdenum oxide; salt, refined silver; crude sulphur; refined pig tin; tungsten ore and concentrate; ferrotungsten; tungsten powder; vanadium ore and concentrate; ferrovanadium; vanadium pentoxide.

Zinc anodes, balls, oxides, powder, and slabs.

The regulation may be amended from time to time to revise the list of exempt products, the Office of War Information reports.

### Equipment Scheduling

THE AMENDMENT of P-56 followed closely the new Limitation Order L-269, which brought mining equipment under complete scheduling, beginning April 1. (*E.&M.J.*, Feb. '43, page 150). Under the terms of this order, equipment manufacturers submit their operating schedules to the Mining Equipment Division of WPB and the manufacturers are required to follow their schedule except as changed by WPB.

Object of the order is to permit a shifting of the sequence of delivery to meet emergencies or in accordance with the urgency of conflicting needs. Products brought under control are listed in the order and include drills, conveyors, mine haulage equipment, hoists, loaders, crushing and grinding machinery, ore-dressing machinery, and specialized mining machinery.

The monthly scheduling of quantities and types of repair parts to be produced is expected to provide a more efficient utilization of production facilities and available materials.

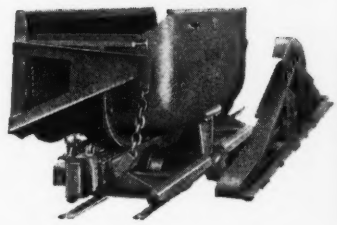
### Access Roads to Mines

CONSTRUCTION of access roads to mining properties may be speeded by the action of the War Production Board in bringing the distribution of repair parts for track-laying tractors under complete control. The purpose of the move was to make repair parts available to essential civilian needs by fixing the channels into which the parts are to go at the producer level rather than at the dealer or distributor level, as heretofore. The machinery by which this is to be accomplished is not so important as the possible effect of the order on the road-building contractors.

Construction of access roads to mines to be built by government funds under the terms of the Defense Highway Act of 1941 started off very slowly. It was the middle of 1942 before the first projects were certified to the Public Roads Administration, and only 100 miles, costing $346,000, had been constructed by the end of the year, according to PRA's own report. Pressure from WPB's topside officials failed to bring about any improvement.

Cause of the delay has been in the field and not in Washington. It has been almost impossible to get contractors to bid on the work, one reason being the difficulties of securing repair parts. Contractors have been unwilling to risk the use of their bulldozers when replacements of parts or complete units could not be secured easily. Construction of a new road in rough country is hard on equipment at best, and to attempt it in the severe weather that has prevailed for most of the winter would have been brutal.

The difficulty of getting the work done by contract is indicated by the fact that U. S. Forest Service is building about 90 projects by force account, U. S. Office of Indian Affairs 6 projects, and U. S. Grazing Service 55 projects. Also, Public Roads Administration has taken on about 15 projects itself. PRA is not a road construction organization. Its duties are to coordinate the efforts of the state highway departments and to see that the federal aid moneys are spent where and as they should be in accordance with the provisions laid down in the basic legislation.

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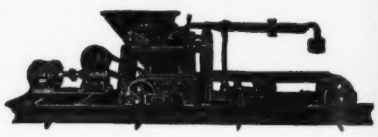

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